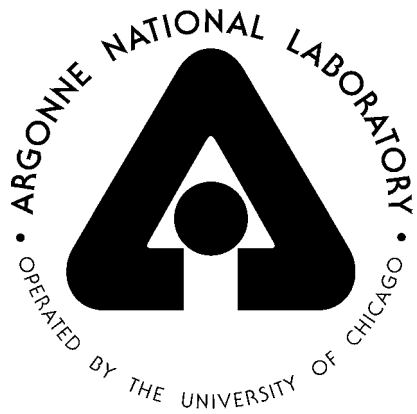


ARGONNE NATIONAL LABORATORY-EAST



DRAFT

Long-Term Stewardship Program Implementation Plan

Argonne National Laboratory-East

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NOTATION

The following is a list of the acronyms, initialisms, and abbreviations used in this report.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ANL-E	Argonne National Laboratory-East
DOE	U.S. Department of Energy
DOE-CH	DOE-Chicago Operations Office
D&D	decontamination and decommissioning
EM	DOE Office of Environmental Management
EQO	Environment, Safety and Health/Quality Assurance Oversight (organization)
ERP	Environmental Remediation Program
FY	fiscal year
IEPA	Illinois Environmental Protection Agency
LTS	long-term stewardship
LTSMS	Long-Term Stewardship Management System
PFS	Plant Facilities and Services Division
SC	DOE Office of Science

DRAFT
LONG-TERM STEWARDSHIP PROGRAM IMPLEMENTATION PLAN
ARGONNE NATIONAL LABORATORY-EAST

1 INTRODUCTION

This document contains elements of a draft of a Long-Term Stewardship Implementation Plan (LTS Plan) for Argonne National Laboratory-East (ANL-E). This LTS Plan was prepared in accordance with the draft guidance for such plans issued by the U.S. Department of Energy (DOE) Office of Long-Term Stewardship in April of 2001. The content of the ANL-E LTS Plan was prepared by first identifying regulatory requirements mandated by the Illinois Environmental Protection Agency (IEPA). Then applicable requirements contained in the April 2001 guidance, the document titled *Site-Specific Requirements in Support of LTS Transfer for Argonne National Laboratory-East*, and in other sources were identified. A means of addressing these LTS requirements at ANL-E was developed and described in the attached documents.

This work was conducted as part of a DOE-Chicago Operations Office (DOE-CH) pilot study regarding the development of LTS Plans for three DOE-Chicago Laboratories: ANL-E, Argonne National Laboratory-West, and Brookhaven National Laboratory. This plan was prepared as a pilot study only and does not represent any final decisions or agreements regarding the scope, funding, or management of the LTS Program, or organization of the LTS Program within ANL-E. Where uncertainty existed relative to the future course of the current Environmental Restoration Program or the future LTS Program, assumptions were made in order to complete the pilot study. These assumptions are described within the attached documents.

2 BACKGROUND

It is anticipated that the ANL-E site will be completing planned remedial actions at former waste management sites in fiscal year (FY) 2003, though possible funding constraints in the FY 2003 budget could delay completion until FY 2004. A parallel program for decontamination and decommissioning (D&D) former nuclear facilities has also been underway and is approaching completion. DOE temporarily suspended the D&D program in early FY 2002 as a result of funding allocation decisions. The remaining D&D work will resume when funds are made available. Both of these programs have been funded and managed by the DOE Office of Environmental Management (EM).

The remediation of former waste sites and nuclear facilities has occurred in a number of different ways. Some units have been completely cleaned of contamination; some have been cleaned to levels of contamination that are acceptable for continued industrial/commercial uses; and others have been closed with significant amounts of waste and contamination left in place. The units closed with waste or contamination in place will require ongoing operation of remedial

systems, surveillance (inspection of site conditions), maintenance of engineered systems, environmental monitoring, and institutional control as part of the long-term stewardship of these sites. These, and the units cleaned only to levels suitable for future industrial/commercial usage, will also require institutional controls to prevent inadvertent contact with buried waste or contaminated media. Long-term management of historic records to document that cleanup was complete to the satisfaction of the IEPA and DOE, and to describe how much contamination, if any, is still present will be required for all units. These activities, and administrative mechanisms needed to support such activities, constitute the LTS Program for ANL-E.

3 STRUCTURE OF THE ANL-E LTS PLAN

The LTS Plan will consist of three elements when finalized: the Transition Plan, the LTS Program Management Plan, and the LTS Management System. A review of the requirements of the LTS Program revealed that they generally fall into three categories: those that address the transfer of the LTS Program from EM to the DOE Office of Science (SC), requirements to manage the technical and administrative measures needed to minimize residual risk, and requirements dealing with managing information that describes the nature of the residual risk and the actions required to minimize that risk. To deal more effectively with each set of requirements, three interrelated management tools will be developed rather than a single written plan; each tool has a different purpose and emphasis.

Transition Plan – This plan describes the process of transferring funding and oversight responsibility for management of former waste sites and nuclear facilities from the EM Program to SC. It discusses specific agreements and commitments between EM and SC related to the transfer and the schedule for the transfer. It also contains a set of acceptance criteria that define the conditions that must be met before a given site can be included in the LTS Program.

LTS Program Management Plan – This document describes managerial aspects of the LTS Program internal to ANL-E. It describes a program structure and organizational approach designed to assure adequate management of the program, sufficient funding to support the program, and mechanisms for financial accountability to ensure proper use of the funds provided. This document contains the LTS Program Baseline, which documents the scope, cost, and schedule for the LTS Program.

Long-Term Stewardship Management System (LTSMS) – This element will consist of an electronic document (Intranet site), elements of which will be publicly available at an Internet site. It will contain summary information on the former remediation sites and LTS Program elements, with additional detailed information made available through the extensive use of hyperlinks to project documents and other detailed information sources. It will serve as a focal point for accessing information about the LTS Program, descriptions of the individual sites and actions being taken, and monitoring data related to the LTS sites. It will also contain information needed to manage the LTS Program, such as LTS work plans, schedules, and procedures. The amount and types of information made available to the general public will depend largely on cyber security restrictions in place when the site is developed. The funding

and time allotted in the LTS Pilot Study did not allow for the development of the actual Web site or population of the site with project information. However, an extensive design development process, developed by ANL-E Environmental Assessment personnel, was completed. A design concept description was prepared to document this process.

This draft LTS Plan contains preliminary versions of the first two plans. These first two documents were prepared as stand-alone written plans, copies of which follow this introduction. The third document included in this draft plan is the conceptual design for the LTSMS. The LTSMS would be developed as part of the implementation of the LTS Program.

4 FINALIZATION AND IMPLEMENTATION OF THE ANL-E LTS PLAN

The transfer of responsibility for the LTS Program is currently expected to occur at the start of FY 2004 or FY 2005, although SC and EM have not yet agreed on a date. In anticipation of this transfer, this Preliminary Draft Plan will need to be reviewed by ANL-E management and EM and SC, and any outstanding issues will be identified and resolved. Where uncertainty regarding some aspect of the LTS Program required that assumptions be made, efforts to resolve this uncertainty will be needed. Various agreements and commitments will need to be negotiated among EM, SC, the DOE-Argonne Area Office, and ANL-E. Any additional guidance from DOE regarding the content and structure of an LTS Plan will need to be addressed. As a result of management reviews, resolution of the uncertainties, and the content of the various agreements, commitments, and final guidance, this draft LTS Plan, including the LTS Program Baseline, will need to be revised, finalized, and approved by ANL-E, DOE-Argonne Area Office, EM, and SC prior to implementation.

A significant source of uncertainty that existed while this plan was being prepared was the future organizational framework for the LTS Program within ANL-E. Several different ways of structuring such a program could be implemented, possibly with equal effectiveness. However, to proceed with the pilot study in light of this uncertainty, a future organizational structure was assumed. This assumed structure is based on program oversight, administrative, and general technical responsibilities residing in a small new organization, the LTS Program, which is assumed to be located within the Environment, Safety and Health/Quality Assurance Oversight (EQO) organization. The LTS Program could exist within the Plant Facilities and Services Division (PFS) and function equally well; however, EQO was selected because many of the planning and information management functions are similar to existing functions within EQO. The LTS Program is assumed to consist of one individual, the LTS Program Manager, with the support of one or more full-time or part-time associates. All other functions are assumed to be delegated to existing organizations that currently carry out similar functions. For example, all monitoring activities associated with the program are assumed to be assigned to the Environmental Monitoring and Surveillance organization within EQO. However, to ensure adequate control of spending, all funds for the program are assumed to flow through the LTS Program, even if the work will be performed by another organization.

A related aspect is the ultimate fate of the two elements of the Environmental Restoration Project: the Environmental Remediation Program (ERP) within the PFS Division and the D&D Group within the Technology Development Division. ERP has been conducting much of the inspection, maintenance, and monitoring work that will be transferred into the LTS Program when the Environmental Restoration Project is complete at the end of FY 2003 or FY 2004. The fate of this organization after planned work is complete was not known when this document was prepared. D&D work was temporarily halted at the end of FY 2002 at the direction of DOE. Whether the D&D organization will remain in existence after FY 2002 is not known. To complete the pilot study, it was assumed that neither organization would exist in their present forms after FY 2004. It was assumed, however, that both organizations would be active members in planning and facilitating the transition of the program from EM to SC. Should either organization remain in existence after FY 2004, they would likely be assigned responsibility for many of the LTS Program functions currently assigned to other organizations in this plan, since they would be ideally suited to carry out these responsibilities. Similarly, if either organization is disbanded before the LTS Program is established, additional responsibilities would fall upon the LTS Program.

The cost estimate included in the LTS Program Baseline was prepared with the best information available at the time; however, some aspects of the work scope had not yet been planned in detail and no reliable cost estimate existed. To complete the pilot study, assumptions were made, where reasonable assumptions were possible, and a cost estimate was produced. In several cases, such as the eventual demolition of former nuclear facilities and final closure of the ongoing remedial actions, no attempt was made to generate estimates. Therefore, the cost estimate should be considered incomplete, and the portions that are complete should be considered only an approximation of the actual costs. Before the LTS Plan can be finalized and implemented, this estimate will need to be reviewed, updated, and independently validated.

In addition, the cost estimate was prepared with the view that all requirements identified during earlier steps of the pilot study would be satisfied, regardless of the relative importance or cost of satisfying the requirements. No attempt was made to prioritize the work scope. Many of the LTS requirements are mandated regulatory requirements and must be satisfied regardless of the final configuration of the LTS Program. However, other requirements are based only on DOE guidance or best management practices. Such requirements include the generation of the Historic Documents Library, public involvement and access to information, periodic performance assessments, contingency planning, and risk assessments. Before the LTS Program can be developed and implemented, the full list of requirements must be evaluated and a determination made as to which of the nonmandatory stewardship actions will be implemented at ANL-E. The LTS Program Baseline and cost estimate would then need to be revised accordingly.

ARGONNE NATIONAL LABORATORY-EAST

DRAFT
Transition Plan for Transfer of Long-Term Stewardship
Activities for Argonne National Laboratory-East
from the DOE Office of Environmental Management
to the DOE Office of Science

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NOTATION

The following is a list of the acronyms, initialisms, and abbreviations used in this report.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ANL-E	Argonne National Laboratory-East
CP-5	Chicago Pile-5 Reactor
DOE	U.S. Department of Energy
DOE-AAO	DOE-Argonne Area Office
DOE-CH	DOE-Chicago Operations Office
D&D	decontamination and decommissioning
EM	DOE Office of Environmental Management
EQO	Environment, Safety and Health/Quality Assurance Oversight (organization)
ERAP	ANL-E Remedial Actions Project
FY	fiscal year
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
LTS	long-term stewardship
LTSMS	Long-Term Stewardship Management System
NFA	No Further Action
NFR	No Further Remediation
PFS	Plant Facilities and Services
RCRA	Resource Conservation and Recovery Act
SC	DOE Office of Science
SWMU	solid waste management unit
TACO	Tiered Approach to Corrective Action Objectives
ZPR	Zero Power Reactor

SUMMARY

This Transition Plan describes the process of transferring the responsibility for long-term stewardship of residual contamination at completed remedial action units located on Argonne National Laboratory-East property from the U.S. Department of Energy Office of Environmental Management to the site Landlord, the DOE Office of Science (SC). It also describes specific roles, responsibilities, and commitments of both parties during and after the transfer. It contains a set of Acceptance Criteria that determine when remedial actions are complete and ready for transfer to SC. It also defines circumstances that may result in the renegotiation of agreements and commitments contained in this document.

**DRAFT
TRANSITION PLAN FOR TRANSFER OF LONG-TERM STEWARDSHIP
ACTIVITIES FOR ARGONNE NATIONAL LABORATORY-EAST
FROM THE DOE OFFICE OF ENVIRONMENTAL MANAGEMENT
TO THE DOE OFFICE OF SCIENCE**

1 INTRODUCTION

This Transition Plan establishes the scope, breadth, and schedule of activities for transferring operations, maintenance, and monitoring responsibilities for former waste disposal sites and former nuclear facilities, from the U.S. Department of Energy (DOE) Office of Environmental Management (EM) to the site landlord, the DOE Office of Science (SC). It captures salient points necessary to describe the transition process and to establish the future path of the remedial actions program at Argonne National Laboratory-East (ANL-E). It delineates administrative and execution responsibilities for each of the parties that are necessary to satisfy current and future requirements and address possible future remedial actions at closed remedial action units that were completed under the EM Program. Such units encompass solid waste management units (SWMUs) included in the Resource Conservation and Recovery Act (RCRA) Corrective Action Program, waste management units not subject to RCRA, and closed radiological facilities that have undergone decommissioning and decontamination (D&D).

This Transition Plan addresses the responsibilities of the parties with regard to the 54 former waste sites and 13 former nuclear facilities listed in Table 1 (see p. 5). The restoration work on these units was included in the EM-funded Environmental Restoration Program that was planned and executed by ANL-E. Remedial actions at units that will transfer to SC will have been completed to the satisfaction of the Illinois Environmental Protection Agency (IEPA) (where applicable) and DOE by the time the transfer from EM to SC occurs. All remaining regulatory and managerial responsibilities for these units will then become the responsibility of SC.

At three of the former nuclear facilities listed in Table 1, D&D work was begun by the EM Program but was suspended in fiscal year (FY) 2001. The EM Program will retain responsibility for completing the D&D of these units as well as conducting surveillance and maintenance until the D&D is complete. As a result, although they will be part of the Long-Term Stewardship (LTS) Program after they are complete, they are not yet included in the transfer to SC.

DOE has been pursuing the cleanup of waste sites and former nuclear facilities at ANL-E under several different authorities. The SWMUs subject to RCRA Corrective Action are being pursued under the authority of the Corrective Action provisions of RCRA, contained in 35 IAC 724.210 (Title 35, Part 724.210, *Illinois Administrative Code*) as administered by the IEPA. Remediation of waste management areas not subject to RCRA is being carried out voluntarily under the authority of DOE. D&D activities at former nuclear facilities are being carried out voluntarily under the authority of DOE as delegated to it by the Atomic Energy Act

(42 U.S.C. 2011 et seq.). The transfer of responsibility discussed in this report does not affect the authorities under which cleanup is being performed.

This Transition Plan also addresses the responsibilities of both parties (EM and SC) should it be determined that additional remedial actions at closed sites are required. Such additional remedial actions may be required because (1) ongoing monitoring of completed remedial actions could indicate that the action has failed or needs to be improved; (2) changes to surrounding land use occur that make prior remedial actions no longer sufficiently protective of human health or the environment; (3) environmental protection standards become more restrictive; or (4) improved technologies are developed that would improve the management of residual contamination, thereby reducing the risk to surrounding populations.

This Transition Plan addresses a commitment on the part of SC to continue pursuing the most effective and cost-effective means of reducing risk caused by residual contamination in closed waste sites at ANL-E. This effort is a requirement of the DOE LTS Program guidance but it is not a regulatory requirement for the ANL-E site. Such pursuit will require periodic reassessment of residual contamination and site conditions, and assessment of possible technologies to address the remaining concerns related to this contamination, namely technologies to improve monitoring of potential releases and containment or destruction of contaminants.

2 USE OF TERMS

Key terms used in this Transition Plan are defined below.

Active site – Any unit that was identified in the approved EM Baseline for which remedial actions have not yet been completed as defined elsewhere in this section.

Records retention – The obligation to keep a complete, accurate record of the nature of environmentally sensitive sites and a full description of all remedial actions conducted on those sites, including portions of on-site units that extend off-site.

Remediation Complete – The condition at a unit for which all anticipated remedial construction actions, including physical construction, site restoration, and equipment start-up, have been completed to the satisfaction of the overseeing authorities (the IEPA in the case of SWMUs and DOE in the case of non-SWMU voluntary cleanup projects and D&D), and all required inspections, operations, maintenance of operational remedies and engineered barriers, and institutional controls are in place. Residual contamination and waste materials may or may not be present at such facilities; however, the remedial actions completed will have reduced the risk associated with any such residual contamination to levels acceptable to the overseeing authorities. Units where remediation is complete would include both No Further Action (NFA) and No Further Remediation (NFR) units as defined below.

Ongoing remediation – A set of ongoing remedial activities at a unit at which all anticipated remedial action construction and start-up of operational remedies have been completed but where residual contamination levels above those necessary to achieve NFA status are present. These ongoing remedial efforts are required to prevent the release of the contaminants, or to remove or destroy the contaminants. These efforts include inspection and periodic maintenance of engineered barriers such as soil caps, roof systems, or paint over contaminated concrete; or the operation and maintenance of operable remedies such as groundwater recovery systems, phytoremediation systems, building drainage systems, or similar ongoing efforts. Routine environmental monitoring may also be required. Such efforts would be required until the contaminant concentrations are reduced to less than the IEPA-approved remediation objectives (or equivalent criteria for non-SWMUs) and the overseeing authority approves the discontinuation of such actions.

No Further Action – The regulatory status of a unit that has been remediated by the removal of contamination to a level that permits other beneficial uses of the land units that were closed by demonstrating that contamination levels are below permissible levels are also considered NFA units. The permissible residual contamination levels at these sites are those determined by using the IEPA Tiered Approach to Cleanup Objectives (TACO) (35 IAC 742) standards for chemical contaminants, or, for radioactive contamination, free release criteria under 10 CFR 835 (Title 10, Part 835, *Code of Federal Regulations*) or other DOE-approved limits. In some cases, the cleanup standards used were based on certain assumptions regarding future land or facility use; therefore, the classification of NFA is valid only when future land or facility use is consistent with the assumptions used to develop the standards. Depending on the nature and magnitude of residual contamination, a unit with an NFA designation may or may not be subject to LTS requirements beyond simple records retention.

No Further Remediation – The regulatory status of a unit where all planned remedial construction work has been completed and ongoing remediation, as defined above, has begun. NFR status for SWMUs is considered granted when the IEPA issues a letter acknowledging that the remedial action construction was implemented in accordance with approved plans and other conditions imposed by the IEPA, but that ongoing remediation is required. This is an informal designation only, since the IEPA does not issue a formal notice of NFR status within the RCRA Corrective Action program.

Long-Term Stewardship – The set of activities needed to (1) ensure compliance with regulatory requirements, including inspection and monitoring, report preparation, performance assessment, document retention, and other required activities; (2) ensure effective operations and maintenance of any remedial action put in place to facilitate ongoing effectiveness of the remedial action; (3) initiate and maintain any institutional controls needed to ensure that sites with residual contamination are not inadvertently disturbed by on-site or off-site personnel; (4) retain all plans, reports, correspondence, and other records related to completed remedial actions; (5) periodically reassess completed remedial actions to ensure that the original remedial actions are still adequately protective of human health or the environment; and (6) develop and maintain contingency plans and procedures to respond to fires, structural collapse, flooding, wind damage, or other catastrophic events that could liberate and disperse contaminants and to detect and correct failures caused by long-term degradation of remedial systems.

3 CURRENT AND FUTURE STATE OF REMEDIAL ACTIONS AT ANL-E

3.1 IMPLEMENTATION OF ENVIRONMENTAL RESTORATION PROGRAM

The LTS responsibilities that are being transferred from EM to SC are related to units that were included in the EM-funded Environmental Restoration Program and have some type of ongoing LTS requirements. The activities to be transferred vary from simple records retention to complex operation, maintenance, and performance assessment of operational remedies. For reasons discussed below, not all of these current stewardship activities are included in this transfer. Table 1 lists the units included in the EM Program (compiled from 1994 and 1999 EM Baselines) and identifies those units requiring LTS actions that are included in this transfer.

Other former waste sites, in addition to those listed in Table 1, were closed by the EM-funded Environmental Restoration Program. These units were closed as a result of verification that no contamination was present, or, if contamination was present, it was completely removed, with no residual waste material or contamination left on the site. These units were closed before the Corrective Actions Portion of the RCRA Part B Permit was issued and are not included in the permit. They are, therefore, also not included in the 1999 EM Baseline. Since there are no ongoing stewardship responsibilities associated with them, they are not included in the LTS Program and are not shown in Table 1.

Some of the units listed in Table 1 were clean-closed by documenting that contamination was not present or by removing contamination completely, and, thus, no longer represent a risk. However, because of the regulatory environment surrounding the SWMUs that were listed in the RCRA Part B Permit, all of these units are included in the LTS Program even if there is no residual risk. In cases where these units were granted NFA status after the site was cleaned to below the most restrictive standards (Tier 1 residential standards), the only stewardship requirement is retention of the project's Administrative Record. In cases where less restrictive standards were used (Tier 1 standards for industrial/commercial land usage or Tier 2 or 3 standards) but a determination of NFA was granted by the IEPA, the requirements include institutional controls as well as retention of project records.

The remedial actions were completed by three organizational entities within ANL-E that acted on behalf of DOE under contract W-31-109-Eng-38. The remediation of former waste sites, both SWMUs and non-SWMU units, and several outdoor radioactive waste storage facilities was the responsibility of the ANL-E Remedial Actions Project (ERAP). This project (which at different times resided in several of the support organizations, most recently by the Environmental Remediation Program which resides in the Plant Facilities and Services [PFS] Division) planned, implemented, and documented all required remedial actions for these units. It also conducted operations, maintenance, and monitoring activities at several of the sites located in the 317/319 Area. The responsibility for ongoing remediation at the 800 Area Landfill has been shared between ERAP and Environment, Safety and Health/Quality Assurance Oversight (EQO), the second organization involved in the program. The Environmental Monitoring and Surveillance organization within EQO has had and continues to have responsibility for routine

TABLE 1 Units Requiring Long-Term Stewardship^a

Description	SWMU No.	Activities To Be Transferred from EM to SC
Units Requiring Ongoing Remediation		
Facility 318 Compressed Gas Cylinder Burial	1	X
319 Area Landfill	2	X
800 Area Landfill	4	X ^b
317 Area French Drain	11	X
317 Area East Vaults Footing Drain	13	X
319 Area French Drain	18	X
ENE 319 Landfill	19	X
800 Area French Drain	20	X ^b
800 Area Landfill Leachate Seep	AOC-C	X ^b
Off-Site Seep	AOC-G	X
317 Area North Vault	NA ^c	X
317 Area Deep Vault	NA	X
Former South Vaults	NA	X
Units Requiring Only Records Retention		
East Area Sewage Treatment Sand Filter Beds	5	X
FEUL Settling Pond	6	X
Freund Ponds	7	X
Lime Sludge Pond	NA	X
Building 108 - Equalization Pond	9	X
317 Area Map Tube Vault	12	X
Laboratory Sewer	21	X
Laboratory Retention Tanks (Bldg. 310)	104-106	X
Sanitary Sewer	132	X
570 Area - Unlined Holding Basin	133	X
570 Area - Laboratory Wastewater Sludge Drying Beds	134	X
570 Area - Sanitary Wastewater Sludge Drying Beds	136	X
Canal Water Treatment Plant Settling Ponds	137	X
East Area Sanitary Sewers	138	X
East Area Burn Pit	142	X
A ² R ² Reactor Excavation Fill	146	X
South of 381 - Ravines Filled with Trash	148	X
Building 34 Mixed Liquid Waste Treatment	150	X
Bldg. 330 Yard with Mixed Materials for Decommissioning	151	X
Waste Oil Storage Area	152	X
Waste Oil SAA (B-205)	159	X
Waste Oil SAA (B-208)	161	X
Waste Oil SAA (B-211)	162	X
Waste Oil SAA (B-212)	163	X
Waste Oil SAA (Bldg. 815)	170	X
Boiler House Spent Sorbent Silo	175	X
Scrap Metal Storage West of Bldg. 827	176	X
Boiler House Ash Silo	177	X
360 Area Fenced Low-Level Radioactive Staging Area	178	X
Storm Sewers - Cooling Tower Wastewater	179	X
Scrap Disposal Area East of 377 Cooling Towers	180	X
Waste Oil Spread on Roads	182	X

TABLE 1 (Cont.)

Description	SWMU No.	Activities To Be Transferred from EM to SC
319 Area Shooting Range	498	X
Building 24 Former Boiler House Pit	693	X
Building 108B - Baghouse Unit	694	X
Laboratory Retention Tank Sump (Bldg. 310)	721	X
Central Boiler House Ash Loader	725	X
800 Area Non-PCB Transformer Storage Pad	736	X
Newly Identified Suspected Solid Waste Landfill	744	X
Building 214 Sump	745	X
AOC-B 800 Area Landfill Wetland Area	AOC-B	X
AOC-F Contaminated Soil Near Bldg. 827	AOC-F	X
AOC-H Contaminated Soil Near Bldg. 24	AOC-H	X
Completed D&D Projects That Require Long-Term Surveillance and Maintenance		
Bldg. 200 M-Wing Hot Cells	NA	d
Bldg 330 CP-5 Reactor	NA	e
Incomplete D&D Projects Requiring Surveillance and Maintenance		
Bldg 315 ZPR Cells 6&9	NA	f
Bldg. 301 Hot Cells	NA	f
Bldg 335 Juggernaut Reactor	NA	f
Completed D&D Project Requiring Only Records Retention		
Bldg. 316 ATSR Reactor	NA	g
Bldg. 597 Ion Exchange Building	NA	g
Bldg. 211 60 in. Cyclotron	NA	g
Bldg. 310 Retention Tanks	NA	g
Bldg. 202 JANUS Reactor	NA	g
Bldg. 331 EBWR Reactor	NA	g
Bldg. 314 Fast Neutron Generator	NA	g
Bldg. 212 Plutonium Glove Boxes	NA	g

^a Abbreviations: AOC = Area of Concern; A²R² = Argonne Advanced Research Reactor; ATSR = Argonne Thermal Source Reactor; CP-5 = Chicago Pile-5; EBWR = Experimental Boiling Water Reactor; FEUL = Fossil Energy User's Laboratory; PCB = polychlorinated biphenyl; SAA = Satellite Accumulation Area; ZPR = Zero Power Reactor.

^b The monitoring and reporting requirements for the 800 Area Landfill are already the responsibility of SC and are not included in the transfer. Inspection and maintenance activities are included in the transfer, however.

^c These units are not SWMUs listed in the RCRA Part B Permit and thus do not have a SWMU number.

^d Surveillance and maintenance activities are already the responsibility of SC and thus are not included in the transition

Footnotes continued on next page.

TABLE 1 (Cont.)

-
- ^e Stewardship of the CP-5 reactor is already the responsibility of SC, with work conducted by both PFS (surveillance and maintenance) and EQO (groundwater monitoring). It is not included in the transfer.
 - ^f The three incomplete D&D projects will remain the responsibility of EM until the remediation is complete. Since the responsibility will not transfer to SC, it is not included in this Transition Plan.
 - ^g These projects have been completed and the facility returned to the operating division. This work is not part of the transfer.

groundwater and gas monitoring and reporting of the results to the IEPA. This activity began before the inception of the Environmental Restoration Program. It has never been funded by the EM Program and was never included in the Baseline. Thus, this responsibility, while part of the LTS Program, is not part of this Transition Plan since it already resides with SC. The EM-funded ERAP project assisted by EQO personnel, however, has had responsibility for inspecting and maintaining the landfill cap. The inspection and maintenance elements are part of the transfer.

The third ANL-E organization responsible for environmental restoration activities was the D&D Group within the Technology Development Division. This organization was responsible for the D&D of former nuclear facilities (reactors, hot cells, and particle accelerators), including the units shown in Table 1. Its activities were temporarily halted in late FY 2002. It is currently anticipated that activities to complete the three outstanding D&D projects may resume in FY 2007, depending on future funding levels.

Of the 13 D&D projects in the EM Baseline, 10 will be completed; many of these, however, will have some level of radioactive contamination left in the structure. The remaining three are not yet complete. Typically, at the completion of a D&D project, the facility is returned to the organization responsible for the building in which it was housed. Any remaining LTS requirements are transferred to that division as well. In two cases, the Building 330 Chicago Pile-5 (CP-5) Reactor and Building 301 Hot Cells, there was no division to which the responsibility could be returned. These two structures have been declared surplus, and the stewardship requirements are the responsibility of PFS. Some of the cost of LTS of the Building 200 Hot Cells is being borne by Laboratory overhead funds channeled through PFS. As a consequence of turning over completed D&D projects to PFS or other divisions, the EM Program has no future responsibility for stewardship requirements at completed D&D units. Therefore, the work scope associated with their management, while part of the LTS Program, is not part of this transfer agreement.

Three D&D projects — Building 301 Hot Cells, Building 335 Juggernaut Reactor, and Building 315 Zero Power Reactor (ZPR), Cell 6 — were temporarily halted in FY 2002 by DOE. These three projects will remain within the EM Program until the D&D is complete. In the mean time, surveillance and maintenance of these three facilities are required and will be carried out by PFS funded by EM. The EM Program has agreed to fund these tasks until the D&D is completed,

which is expected to start in FY 2007. Therefore, this work scope, while it is part of the LTS Program, is also not part of this transition since it will remain within EM.

Other small remedial action and D&D projects have been completed outside of the Environmental Restoration Project. Examples of such actions include removal of contaminated asphalt and soil outside of Bldg. 306, removal of several underground storage tanks, and removal of radioactive contamination within various research facilities. These projects were completed without EM funding and are not involved in the transfer. The need for stewardship efforts at these sites has not yet been assessed, but is likely to be minimal.

3.2 STATUS OF ENVIRONMENTAL RESTORATION PROGRAM AT POINT OF TRANSFER

At completion of ERAP activities by late FY 2003, it is anticipated that all 54 SWMUs listed in the RCRA Part B Permit will either be granted NFA status or be in the NFR mode (ongoing remediation required). The IEPA does not provide an official notice declaring a site in NFR status. Rather, this status is derived from letters from the IEPA approving the construction report for completed actions and defining the ongoing remediation requirements. At the time of transfer, all necessary reports will have been submitted to and approved by the IEPA. The required ongoing remediation requirements (operations, maintenance, monitoring, and reporting) will have been put in place and proven to be functioning as designed.

The planned work at the non-SWMU waste sites (Lime Sludge Pond, 317 Area Vaults) will be completed to the satisfaction of DOE. The only ongoing remediation requirement will be voluntary groundwater monitoring associated with the 317 Area vaults. There are no anticipated LTS requirements for the Lime Sludge Pond. Documentation that these projects are complete will consist of letters from DOE declaring their completion.

At the end of FY 2003, all but the three halted D&D projects will be completed and the facilities turned over to the ANL-E division responsible for the particular structure or to PFS. The eventual D&D of the three halted projects will continue to be the responsibility of EM, as well as the surveillance and monitoring required until D&D is complete.

3.3 VISION OF LTS PROGRAM AFTER TRANSFER

Following the transfer of the LTS requirements that are currently funded by EM to SC, all aspects of institution management and ongoing remedial operations of former waste sites will be the responsibility of SC, with the day-to-day operations delegated to ANL-E. The LTS of the completed former D&D sites will be the responsibility of several programmatic divisions and PFS. Until D&D are complete, the LTS of the three incomplete D&D projects will be carried out by PFS; however, funding will be provided directly by EM. After D&D is complete, any LTS requirements will then transfer to SC.

The organizational structure within ANL-E and the internal delegation of authority and distribution of the necessary funding to conduct the required LTS activities will be determined by ANL-E during development of the LTS Program in FY 2004 or FY 2005. This organizational structure may change from year to year as personnel and organizations change and the scope of the program changes.

The role of EM in the LTS Program after the transfer will consist of funding the surveillance and maintenance of the three incomplete D&D projects. It will also be responsible for the future completion of these projects; however, this D&D work is not in the scope of the LTS Program. In addition, the EM Program will serve as a resource for SC should future remedial actions beyond the scope of the LTS Program become necessary. It is assumed that after the current EM Baseline work is complete, the EM Program will institute a method for requesting EM funds for specific projects that fit within the scope of the EM Program. Should the need for such remedial actions arise in the future, SC will prepare a formal request for EM funds for discrete, defined projects that support the remedial actions program but are of a nature or magnitude that cannot be addressed within the LTS Program.

3.4 REMEDIAL ACTION UNITS END STATE VISION

The LTS Program, by its nature, is a very long-term if not indefinite program. As long as buried waste or contamination at concentrations above the most protective levels are present, some type of stewardship will be required. The nature of this stewardship will change from year to year as sites complete their ongoing remedial actions, regulatory requirements change, or ANL-E land use or ownership changes. At some point in time, likely to be at least 20 years in the future, the sites will achieve a stable end point, after which the conditions and requirements are not expected to change significantly. The anticipated stable end state vision for each unit is shown in Table 2. This table is based on several assumptions regarding future remedial actions, including the demolition of Buildings 330 and 301 (with in-place burial of concrete debris from Building 330 but complete removal of debris from Building 301); the successful complete decontamination of the three suspended D&D projects; and the effectiveness of natural attenuation and phytoremediation in reducing residual volatile organic compound concentrations in most of the 317 Area. It also assumes that after the current 15-year post-closure care periods for the three landfills expire, similar though less extensive inspection, maintenance, and monitoring requirements will remain indefinitely.

As shown in Table 2, the final status of the LTS Program will likely still require both active measures (inspection and maintenance of engineered barriers and limited groundwater monitoring) as well as passive measures (records retention and management of residual materials from these areas). While this work scope will be greatly reduced from the work required during the first 10 to 20 years of the program, it will still require significant effort and commitment of funds. These efforts are likely to be required in perpetuity.

TABLE 2 Vision of Final Status of Remedial Units and Final LTS Requirements

Remedial Unit	Final Status	Final LTS Requirements ^a
Landfills (800, 319, East-Northeast)	Post-closure care period expires. Waste remains in place under cap.	Annual inspection and periodic groundwater monitoring required, institutional controls in place and maintained. Groundwater management zone (GMZ) in the 319 Area reduced in size but will remain in effect.
317 French Drain	Bulk of soil volatile organic compound (VOC) levels below remediation objectives, but hot spots located under structures or buried obstructions remain. Groundwater at fenceline in compliance with Class I groundwater standards. Phytoremediation system and groundwater extraction system removed.	GMZ reduced to vicinity of French Drain. Periodic groundwater monitoring at GMZ perimeter continues.
Off-Site Seeps	VOC concentrations in seeps reduced to less than Class I standards.	None
317 Area Vaults	Residual radioactivity reduced by decay, but contamination remains.	Periodic groundwater monitoring.
Bldg. 330 CP-5	Concrete with high residual hydrogen-3 levels will be removed when the facility is demolished. The remaining structure will be demolished in place with some low-level hydrogen-3 and activation products present.	Periodic groundwater monitoring; inspection and maintenance of soil or asphalt cover.
Bldg. 301	Structure will be demolished with waste disposed of off-site.	None (assuming no contamination under the building exists)
Unfinished D&D Projects	D&D will be complete. Contamination will be removed to free-release levels, making the facility useable for other purposes.	None (assuming all contamination is completely removed)
Bldg. 200 Hot Cells	Facility will be declared surplus; D&D will be conducted; the structure will be demolished and waste disposed of off-site.	None (assuming no releases from the structure have occurred)

^a Retention of records and proper management of residual contamination, where present, is required in perpetuity for all remedial action units.

4 TRANSITION PERIOD ACTIVITIES

The actual date of transfer has not yet been negotiated between EM and SC. The transfer of responsibility from EM to SC currently is projected to occur on October 1, 2003, although funding limitations in FY 2003 may delay the completion of remedial actions, and thus the transition to LTS, until October 1, 2004. However, prior to this point in time, several activities must be completed to ensure a smooth transition.

4.1 IDENTIFICATION OF CLEAR LINES OF AUTHORITY AND PROGRAM EXPECTATIONS

Before the LTS work can be properly carried out, a set of clear lines of authority and accountability must be established. The authority will flow from the DOE Secretary of Energy through the DOE field office, to ANL-E who will conduct the bulk of the required work. For those activities currently funded by SC or to be transferred to SC in the future, DOE authority flows from the Secretary of Energy through the Cognizant Secretarial Office, which, in the case of ANL-E, is the Office of Science, to the Chicago Operations Office (CH) Manager, through the Argonne Area Office (AAO) Manager, to the University of Chicago, the maintenance and operation contractor for ANL-E. DOE-AAO has the primary responsibility for directing and overseeing the work at ANL-E. Working with the participation of DOE-CH, ANL-E, and the EM and SC Program Offices, DOE-AAO will define the expectations and requirements of the LTS Program for ANL-E, establish critical outcomes, and identify performance measures related to the LTS Program. To ensure that the LTS Program is fully compliant with all applicable expectations prior to the inception of the LTS Program, DOE-AAO will need to provide suitable guidance and direction. This guidance needs to be provided early enough to allow the ANL-E LTS Program Plan to be finalized, reviewed, and approved by ANL-E and DOE management, and the program structure to be put in place soon after the transfer to SC.

Following the transfer, the DOE-AAO will continue to provide day-to-day oversight of LTS activities, reporting the status and condition of the LTS Program up the normal chain of command. DOE-AAO will utilize specialized support staff from throughout DOE, as needed, to ensure adequate oversight of LTS activities. This oversight will include the assurance that all regulatory requirements are being adequately met; an adequate budget is requested and provided to support the program; a suitable LTS Plan is maintained; appropriate institutional controls are put in place and maintained by DOE and ANL-E; and compliance with the requirements for an LTS Program, as defined by SC.

DOE-AAO will have the authority and responsibility to ensure that LTS Program activities, as planned and implemented, adequately protect human health and the environment from risk associated with residual waste material and contamination at closed wastes sites. DOE-AAO has the authority to modify the LTS Program as needed to ensure that this goal is consistently met.

4.2 LONG-TERM STEWARDSHIP PROGRAM MANAGEMENT PLAN

Prior to the transfer, ANL-E will finalize the LTS Program Management Plan (a draft of which is included in this document) that will describe the requirements of the program and explain the methods to be used to satisfy these requirements. When finalized, this plan will demonstrate how ANL-E will satisfy the requirements and expectations for an LTS Program as specified by current and future DOE guidance. The plan will be reviewed and approved by the participating ANL-E organizations that will implement the program, by ANL-E site management, and by DOE management. In addition to defining the scope of the routine ongoing LTS activities, the plan will stipulate the need to develop one or more management tools (such as the Long-Term Stewardship Management System [LTSMS]) that are not yet in place and will not likely be in place by the end of FY 2003. A schedule will be included that will show when these systems will be developed and will identify the resources needed to develop them. Information such as this will appear in the LTS Program Baseline, which will be an element of the LTS Program Management Plan.

4.3 ANL-E LONG-TERM STEWARDSHIP ORGANIZATION

Prior to the transfer of responsibility, the organizational structure of the LTS Program within ANL-E will be put in place. The responsibility for planning and implementing the LTS Program within ANL-E will reside primarily with the EQO Director. This organization will retain the responsibility for most of the environmental management functions within ANL-E and will integrate the LTS Program with related environmental management elements for which it is already responsible. EQO will utilize various divisions and individual personnel within ANL-E as needed to faithfully carry out the program elements. The details of the ANL-E organization responsible for the LTS Program can be found in the LTS Program Management Plan. From time to time this organizational structure will change, in response to large organizational changes, personnel changes, or changes to the LTS Program. These changes will be captured in updates to the LTS Program Management Plan.

4.4 COMPLETION OF ENVIRONMENTAL RESTORATION ACTIVITIES BY EM

One role of EM prior to the transition includes the completion of all currently unfinished remedial actions work encompassed in the Remedial Actions Program Baseline, including completing all necessary documentation and obtaining approval letters from the IEPA for the work completed. The EM Program shall ensure that all of the sites are in a stable, industrially safe condition suitable for long-term maintenance without the need for any modification of the units. EM shall be responsible for ensuring that all units being transferred into the LTS Program will meet the acceptance criteria discussed in Section 7. In addition, the EM Program shall ensure that a complete copy of the Administrative Record for each unit is compiled and made available to the LTS Program for records retention purposes. In addition to the complete administrative record, a set of important project decision documents, including work plans, reports, approval letters, and similar documents, shall be prepared and turned over to the

LTS Program. This latter set of documents will include both paper copies and computer files that contain the key documents in electronic format.

4.5 DEVELOPMENT OF MANAGEMENT SYSTEMS

The ANL-E LTS Program as currently envisioned will be an integrated program that utilizes various existing organizations and personnel with the necessary technical expertise, administrative authority, and human and financial resources to conduct the required activities. The specific structure of the program will be included in the LTS Program Management Plan, a draft of which is included in this document. This plan will form the primary management system to ensure the smooth functioning of the program. This plan will be consistent with the Environmental Management System for the ANL-E site when it is completed.

The LTS Program will generate performance reports for submittal to the DOE in accordance with the format and schedule requested by DOE-AAO. Requirements for such reporting have not yet been established by DOE-AAO. It is anticipated that the performance of the LTS Program will be reflected in site contract performance measures.

A second important management tool is the LTSMS. This system, which has not yet been developed, will consist of an Internet-based information management tool that will make a large amount of current and historic information regarding the LTS units available to both on-site and off-site stakeholders. This tool will satisfy many of the LTS Program requirements related to retention and dissemination of information related to residual hazards, land use restrictions, ongoing remediation requirements, environmental monitoring, regulatory reporting, public education and participation, and many other elements. A design brief, describing the general objectives and structure of such a system, is contained in this document. Anticipated funding limitations will likely result in the LTSMS being developed in phases during the first few years.

5 KEY ROLES AND RESPONSIBILITIES

The section summarizes key roles and responsibilities of EM and SC necessary to ensure a smooth transition of responsibility and effective management of the LTS Program following the transfer.

5.1 PROGRAM MANAGEMENT AND FUNDING

1. Following the transfer, SC shall fund and conduct all activities related to routine long-term stewardship of the LTS sites, including the following elements:
 - Budget programming and allocation;

- Compliance with all applicable regulatory requirements contained in the RCRA Part B Permit, DOE Orders, and other regulations;
- Operations, maintenance, monitoring, surveillance, and reporting as specified in IEPA-approved permits, plans and other documents and DOE directives;
- Land use controls to prevent inadvertent disturbance of closed sites;
- Information management;
- Emergency response and corrective action for performance deficiencies;
- Periodic performance reviews and optimization studies;
- Final site closeout when remedial actions are completed; and
- Stakeholder participation in planning and implementing the LTS Program.

SC shall request sufficient appropriations in the annual Energy and Water Development Appropriation Act for all activities related to long-term stewardship of LTS units. SC shall provide adequate management oversight, prepare annual estimates, and prepare funding requirements and budget justifications for these activities. Such activities and budget requests shall be consistent with the LTS Baseline as updated annually.

The funds required for the LTS Program are defined in the Baseline. The Baseline describes the total budget needs, regardless of the source of funds. Several of the LTS activities represent a continuation of ongoing activities that are being brought under the umbrella of LTS for administrative purposes. The funding for these ongoing activities currently comes from two sources, SC and EM. Funding for the Environmental Monitoring Program is currently provided by SC (provides for monitoring of the 800 Area and CP-5, and limited sampling in the 317/319 Areas), as is part of the cost of surveillance and maintenance of former nuclear facilities. This funding is provided through an indirect "tax" on ANL-E program funds (ANL-E indirect budget). Other funds are provided by the EM Program (surveillance and maintenance of three unfinished D&D facilities) and will continue to be provided until these projects are completed. Table 3 identifies the current (FY 2002) and anticipated (FY 2004 and beyond) source of funding for the LTS scope.

The cost estimate shown in Table 3 includes the general management and planning tasks associated with establishing and maintaining the LTS Program, as well as the ongoing operation, surveillance, maintenance, and monitoring activities. The cost for monitoring currently conducted by the EQO

TABLE 3 Funding Requirements for LTS Program

Function	Scope Included in Transfer	Funding Source in FY 2003	Funding Source in FY 2004	One- Time FY 2004 Costs	One- Time FY 2005 Costs	Annual and Periodic Costs (Escalated dollars) ^a				
						FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Tasks with One-Time and Annual Costs										
LTS Program Management	X									
Administrative Management	X	NA ^b	SC	\$31,962		\$75,594	\$78,240	\$80,978	\$83,813	\$86,746
Technical Management	X	NA	SC	\$90,448		\$88,166	\$91,252	\$94,446	\$97,751	\$101,173
Stewardship Operations										
Engineered barriers inspection and maintenance	X	EM	SC			\$40,635	\$42,057	\$43,529	\$45,053	\$46,629
Operational remedies operation and maintenance	X	EM	SC			\$288,745	\$298,851	\$309,311	\$320,137	\$331,341
Environmental monitoring	X									
Past EM funding, transferred to SC	X	EM	SC			\$120,882	\$125,113	\$129,492	\$134,024	\$138,715
Current overhead budget (EQO)		SC	SC			\$535,555	\$554,299	\$573,700	\$593,779	\$614,561
New overhead funds	X	NA	SC	\$332,558		\$31,031	\$32,117	\$33,241	\$34,405	\$35,609
Former nuclear facilities surveillance and monitoring						\$1,050,603	\$1,087,374	\$1,125,432	\$1,164,822	\$1,205,591
Future EM funding		EM	EM			\$384,000	\$396,000	\$408,000	\$420,240	\$432,847
Current overhead budget		SC	SC			\$666,603	\$691,374	\$717,432	\$744,582	\$772,744
Contingency Planning	X	NA	SC	\$61,306						
Information Management	X	NA	SC	\$79,066	\$130,982	\$102,823	\$106,422	\$110,146	\$114,001	\$117,991
Institutional Controls	X	NA	SC	\$30,485		\$2,537	\$2,626	\$2,718	\$2,813	\$2,911
Periodic Tasks										
Performance Assessments and Plan Updates	X	EM	SC					\$63,655		
Contingency Plan Update	X	NA								
Final Closure										
Subtotal	X	NA				\$2,962,395	\$2,549,332	\$2,566,648	\$2,590,598	\$2,681,269
Contingency (10%)						\$296,239	\$254,933	\$256,665	\$259,060	\$268,127
Total with contingency						\$3,258,634	\$2,804,266	\$2,823,313	\$2,849,658	\$2,949,396
Total SC funding needed						\$2,874,634	\$2,408,266	\$2,415,313	\$2,429,418	\$2,516,549
Incremental SC funds needed						\$1,672,477	\$1,162,593	\$1,124,181	\$1,091,057	\$1,129,243

^a An escalation rate of 3.5% was assumed. Cost estimate was based on FY 2002 dollars.

^b NA = not available; cost estimates for these two tasks were not available when this document was prepared.

Environmental Monitoring and Surveillance Program and the surveillance and maintenance activities are already the responsibility of SC. The cost of surveillance and maintenance of the three suspended D&D projects will be provided by EM. Thus, only a part of the total cost in Table 3 will require new funding from SC in FY 2004. The incremental funding needed in FY 2004 through FY 2008, assuming programs currently funded by SC (through the ANL-E indirect budget) will continue to be funded in this manner, is shown in the bottom row of Table 3. The next-to-last row lists the total funding requirements that SC will provide. The total SC funding amount is based on the total funding need, minus the funding amount provided by EM. The costs in Table 3 are based on the Baseline cost estimate but are escalated at a rate of 3.5% per year and include a 10% contingency allowance.

2. ANL-E shall prepare an LTS Program Management Plan describing all activities necessary to adequately meet the requirements of long-term stewardship for LTS sites. Such a plan shall be prepared in conformance with guidance provided by DOE-AAO.
3. EM shall support the establishment of an LTS Program by providing whatever information and assistance are needed to generate a complete and accurate record of past remedial actions.

5.2 OPERATIONS AND OVERSIGHT

1. SC shall ensure that the performance of the remedial systems in place are monitored to confirm that they are working as designed and determine if modifications or improvements of these actions are required. Extensive reviews of the performance of these systems shall be completed at least every 5 years. The need for repairs, replacement, or minor improvements to completed actions shall be identified and implemented as part of routine maintenance. If the scope of such modifications or improvements is beyond that of routine maintenance, SC shall prepare a request for funding to be submitted to the EM Program or other potential funding source. The management and implementation of any such modification or improvement are outside the scope of the LTS Program. Responsibility for such an action will be assigned at the time funding is approved.
2. SC shall ensure that remedial action sites that require ongoing remediation are monitored to determine when the final remediation objectives have been met and the remedial actions can be terminated (removal of remedial systems such as wells, pumps, and phytoremediation plantations). Once final remedial objectives have been met, the operational remedies shall be shut down and the site closed out in accordance with IEPA requirements. All efforts to plan, implement, and gain regulatory agency approval of final closeout activities at these units will be the responsibility of SC.

3. SC shall ensure that the ANL-E site conditions are monitored and that diligence is exercised to locate other contaminated environmental media or facilities that require remedial actions. Should such a site or facility be identified, SC shall prepare plans and provide funds, or prepare a funding request for submittal to EM or some other funding source for the necessary funds, to conduct remedial actions necessary to protect human health and the environment from releases from the new units.
4. EM shall make available to SC location survey information; accurate descriptions of the final conditions of each unit completed; at least two copies of all decision documents, including plans and reports submitted to regulatory agencies and correspondence with the agencies; contractual documentation; administrative records; technical records; financial records; schedules and all other pertinent project documents and supporting information.
5. EM shall assume no more responsibility for ongoing remediation of former waste sites or surveillance and maintenance of D&D units, unless additional remedial actions, including major repairs, upgrades, major improvements, or replacements of existing remedial systems, which are beyond the scope of the LTS Program, are requested by SC and authorized by the EM Program. Currently, no such actions have been proposed to EM.
6. EM shall be responsible for providing funding, administrative oversight, regulatory compliance oversight, and technical support as necessary to conduct routine surveillance and maintenance and complete the remaining D&D operations at the Building 335 Juggernaut Reactor, Building 301 Hot Cells, and Building 315 ZPR Reactor, Cell 6, in accordance with the Environmental Restoration Program Baseline. A firm date for the resumption of D&D activities halted in FY 2002 has not yet been determined. The funding for surveillance and maintenance shall continue until the D&D is completed.
7. Upon receipt of a request from SC to plan and conduct remedial actions at a newly discovered site or additional remedial actions at a completed site, EM shall review the proposal and determine whether or not the work should be included in the EM Program.
8. Should the additional remedial action work be included in the EM Program, EM shall assume full responsibility for funding and managing the action, including ensuring that the necessary planning, engineering, contracting, fieldwork, and reporting are performed in accordance with DOE policy and regulatory agency requirements.

5.3 COMPLETION OF INCOMPLETE REMEDIAL ACTIONS

This document was prepared with the assumption that all the units in Table 1 (not including the incomplete three D&D projects: Building 301 Hot Cells, Juggernaut Reactor, and the ZPR, Cell 6) will satisfy the acceptance criteria discussed below and will be transferred to SC by the transfer date. It is possible, however, that some of the criteria for specific units may not be met by that date. By the date of the transfer, EM shall develop plans and a schedule to complete the outstanding elements in an expeditious manner. Any remaining cost to complete outstanding elements past the transfer date shall be incurred by EM.

6 TRANSFER CRITERIA

This section describes the set of criteria that define when remedial actions for a given unit are complete and that unit is in a suitably stable condition for transfer to the LTS Program. The criteria include regulatory and administrative factors as well as technical factors.

1. All planned remedial construction activities must be complete (soil removed or treatment systems installed, wells installed, cap construction completed, etc.) and the action approved by the IEPA and/or DOE. The stewardship of full and accurate documentation regarding the completed actions shall be transferred to the ANL-E organization to which SC delegates responsibility for managing the LTS Program. Such documentation includes the following items:
 - Construction work plans and reports,
 - Soil boring logs,
 - Well completion reports,
 - Analytical data reports,
 - Design drawings and specifications,
 - Operation and maintenance manuals, and
 - Physical and geotechnical data confirming the proper construction of the measures.

The transfer of stewardship of these documents will be facilitated by compiling a complete list of appropriate documents, providing full document citations, and identifying the location of each of the documents. The list of documents and current management procedures will be reviewed to identify which, if any, need to be physically relocated from their current location. All

future management of these documents will then be the responsibility of the LTS Program.

2. Site restoration following the remedial actions must be complete (e.g., excavations filled and the site restored and the area left in a safe condition). Final conditions shall be documented by photographs, topographical maps, engineering drawings, or other means.
3. D&D activities shall be complete (contaminated surfaces removed to less than DOE-defined levels and final surveys of D&D facilities completed) to the satisfaction of DOE and the facility owner. The facilities shall be left in an industrially safe condition and transferred to the organization responsible for its future use or surveillance and maintenance and eventual demolition. The actions taken and the nature, extent, and location of residual contamination shall be documented and the documentation made available to SC.
4. Remedial systems shall be constructed as designed, start-up completed, and equipment properly maintained and in stable operation and successfully and efficiently meeting all applicable performance criteria. Records describing the past performance history, the system start-up process, and operation up until the point of transfer shall be made available to the organization managing the LTS Program.
5. Facilities housing former nuclear facilities that require surveillance and monitoring shall be fully functional and in good repair, with no major structural weakness or known equipment faults.
6. All remedial action documentation must be complete and approved by the IEPA and DOE (in the case of former waste sites) or DOE (in the case of D&D projects) as applicable. Any unresolved regulatory issues, pending determinations, incomplete documentation or other regulatory issues shall be documented and discussed with SC prior to the transfer. The stewardship of the Administrative Record for remedial actions and D&D shall be transferred to SC. A second copy of all key decision documents shall also be transferred to the LTS Program organization. Computer files of electronic versions of these documents, where such exist, shall also be provided to the LTS Program organization.
7. Site conditions following completion of remedial actions shall be documented to the extent necessary to understand and manage the residual risks present at each unit. Adequate documentation describing the site conditions shall be transferred to SC and shall include:
 - Final site topography, including precise location information for features such as roadways, fences, structures, underground and aboveground

- utilities, surface elevations and contours, property lines, right-of-ways, and other pertinent information. Such information shall extend far enough away from the site to identify the location of the nearest human receptors and sensitive ecological areas.
- Precise location of contaminated regions or buried waste material, both aerial extent and vertical extent.
 - Location of groundwater under sites where groundwater contamination is present, including depth, velocity of groundwater movement, direction of groundwater movement, and the nearest consumer of the groundwater or aquifer discharge point.
 - Precise location of monitoring points, such as groundwater monitoring wells, surface water sampling locations, or leachate sampling points.
 - Precise location and extent of remedial systems, including subsurface barrier walls, caps, engineered barriers, warning signs, and groundwater extraction wells and associated piping and control systems.
 - Characterization of the nature and extent of residual contamination and likely fate of this residual contamination.
 - Identification of the nature and degree of uncertainty associated with the characterization of residual contamination.
 - Basis for NFA determination, including remediation criteria used, assumptions used to select those criteria and maximum residual contaminant concentrations.
8. Operation and maintenance requirements shall be fully described and communicated to SC through the transmission of up-to-date operation and maintenance manuals or other documents. Maintenance logs, inspection logs and blank forms, and inspection and maintenance schedules shall also be provided. A cost estimate for operation and maintenance activities shall be included in the Baseline.
9. All IEPA-mandated permits, work plans, reports, and other regulatory vehicles describing regulatory requirements shall be accurate and up to date. Any outstanding issues between ANL-E and the IEPA shall be resolved to the maximum extent possible before the transfer.
10. Emergency response and contingency planning shall have been completed. Such planning includes identification of possible failure scenarios and descriptions of actions that need to be taken to mitigate any hazard from an

unplanned catastrophic failure or gradual degradation of the remedial systems.

11. Identification of areas where on-site or off-site land use restrictions or other institutional controls are needed and the nature of these restrictions and controls.
12. The ANL-E site real estate records shall be brought up to date, with all necessary deed restrictions or other legally binding restrictions included.
13. Agreements with off-site stakeholders, such as the Forest Preserve District of DuPage County, shall be finalized.
14. ANL-E shall prepare a LTS Program Baseline for review and approval by EM, SC, and ANL-E management prior to the transfer. The Baseline shall describe the technical scope, provide the annual funding requirements for LTS activities, and provide a schedule for these activities.
15. SC shall commit sufficient funding for the LTS Program following the transfer, in accordance with the Baseline, and shall commit to provide future funding in accordance with the Baseline.
16. ANL-E shall identify the organizational structure of the LTS Program and identify the means of assuring that an adequate number of qualified ANL-E or contractor personnel are committed to the program to assure its success. ANL-E shall identify a means of ensuring that the funds allocated to the LTS Program are efficiently utilized for the activities for which they are intended.

7 TRANSFER SCHEDULE

The transfer of all units that meet the acceptance criteria is currently expected to occur on October 1, 2003, although transfer may be delayed until FY 2004 if funding restrictions prevent completion of remedial actions in FY 2003. At that point, all remaining remedial action requirements for these units will transfer from EM to SC. Units that do not meet the criteria shall remain the responsibility of EM until the criteria are met or a plan is put in place to ensure that they are met in an expeditious manner. In addition, all of the DOE-mandated requirements of the LTS Program, which extend beyond the current regulatory requirements, will be the responsibility of SC. However, to prepare for this transfer, several activities will need to be completed in the year prior to the transfer.

DOE-AAO provides guidance on LTS Requirements	October 1, 2002, or 2003
Draft LTS Plan (including Baseline) completed	January 31, 2003, or 2004

LTS Plan finalized	April 30, 2003, or 2004
LTS Plan and Baseline approved by DOE	July 31, 2003, or 2004
ANL-E LTS organization in place	August 29, 2003, or 2004

Within 90 days of the transfer (January 30, 2004, or 2005), stewardship of all of the documents and other information required under the acceptance criteria shall be transferred to the LTS organization. This transfer may not require physical movement of all documents but may constitute a conveyance of information regarding the locations of stored or archived records and procedures needed to recall archived material. Future stewardship responsibility for these documents shall be transferred to the LTS Program.

To ensure adequate funding for the LTS Program, SC shall have requested the funding far enough in advance that adequate funds, in accordance with the approved Baseline, will be available at the start of the LTS Program in October 2003 or 2004.

8 RENEGOTIATION TRIGGERS

The various agreements and commitments described in this plan are based on certain assumptions and understandings of site conditions and future LTS requirements. The projected funding needs and technical requirements are also based on a similar set of assumptions and understandings. While some variation from these assumptions and understandings can be handled in the normal course of managing this program, major deviations from these assumed conditions are likely at some point in the LTS Program. Should conditions develop that are significantly different than the anticipated conditions, some of the agreements and commitments in this document may need to be revised. The following is a list of possible conditions that could trigger renegotiation of these agreements:

- Major process failure of a remedial system even though the system was operating as designed and properly maintained;
- Catastrophic damage to remedial systems or facilities due to fires, floods, tornadoes or other factors;
- Changes in land ownership or land usage, on- or off-site;
- Discovery of previously unknown contamination requiring remediation and long-term stewardship;
- Shutdown of currently active contaminated facilities or units that require remedial actions or D&D, followed by long-term stewardship not included in the Baseline;

- Changing DOE expectations for the LTS Program;
- Changing cleanup standards; or
- Changing regulatory requirements.

The occurrence of one or more of these triggers would result in modification of the LTS Plan and Baseline. In addition, if the consequences of the event are beyond the scope of the LTS Program to resolve, requests for the assistance of EM or other agencies may be generated. This assistance could range from additional funding or technical assistance, to complete delegation of the response activity to EM or the other agency.

9 GENERAL ASSUMPTIONS AND UNDERSTANDINGS

In developing this Transition Plan, a number of general assumptions about the future direction of remedial actions and site circumstances were made, including the following:

- Land use – It is assumed that, in the future, usage of the ANL-E site will continue much as it is now, with the entire site remaining under the control of the federal government. It is further assumed that all land usage on the site will be industrial or commercial in nature and that no part of the site will revert to a residential type of land usage. Effective site access controls will remain in effect, preventing unauthorized entry into contaminated areas.
- Site ownership and management – It is assumed that the owner and manager of the ANL-E site throughout the life of the LTS Program will continue to be DOE or a comparable segment of the federal government. Stewardship requirements would change significantly should all or part of the site be transferred to a new owner, whether private or public.
- Technical assumptions – The Baseline lists a number of detailed assumptions related to individual remedial actions or program elements. In general, it is assumed that the remedial actions put in place will perform as designed and achieve the desired performance objectives without major modification or repairs. For the engineered barriers, it is assumed that they will afford the required level of containment indefinitely with only routine repair of erosion damage. For the groundwater extraction systems, it is assumed that they will continue to function as designed and maintain hydraulic control until the contaminant levels are reduced to less than the final remediation objectives. For the phytoremediation system, it is assumed that the trees will remain healthy, and that their influence on groundwater flow and contaminant concentrations will increase until the system is mature. It is assumed that even after the phytoremediation plantation is mature and as much contamination is removed as possible, pockets of contamination, exceeding the IEPA

remediation objectives, will remain, particularly under the vaults, the 319 Landfill cap, and below buried obstructions such as boulders. Thus, the entire 317 Area will not achieve the final remediation objectives.

- Final remediation objectives – The IEPA provided remediation objectives for soil within the 317 Area and has applied the current Class I groundwater standards to groundwater downgradient of the 317/319 Area and below the 800 Area Landfill. It is assumed that these will remain the standards in effect for the life of the LTS Program. Should these change, either increasing or decreasing, significant changes to the LTS Program may be necessary.
- Regulatory agency actions – It is assumed that the regulatory environment, including applicable laws and regulations, groundwater quality standards, regulatory personnel, reliance on site-specific risk-based remediation objectives, and the current positive working relationship with regulatory agencies will remain essentially unchanged for the life of the LTS Program. Of particular importance are the current requirements for a 15-year post-closure care period for landfills and the risk-based remediation standards defined in the TACO regulations.

ARGONNE NATIONAL LABORATORY-EAST

DRAFT
Program Management Plan for
Argonne National Laboratory-East
Long-Term Stewardship Program

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NOTATION

The following is a list of the acronyms and abbreviations used in this report.

ANL-E	Argonne National Laboratory-East
DOE	U. S. Department of Energy
DOE-AAO	DOE-Argonne Area Office
D&D	decontamination and decommissioning
EQO	Environment, Safety and Health/Quality Assurance Oversight (organization)
ERP	Environmental Remediation Program
ESH	Environment, Safety and Health
FY	fiscal year
IEPA	Illinois Environmental Protection Agency
ISM	Integrated Safety Management
LTS	long-term stewardship
O&M	Operation and Maintenance (Plan)
PFS	Plant Facilities and Services Division
PMM	Project Management Manual
PMP	Program Management Plan
TD	Technology Development Division
WBS	work breakdown structure

**DRAFT
PROGRAM MANAGEMENT PLAN FOR
ARGONNE NATIONAL LABORATORY-EAST
LONG-TERM STEWARDSHIP PROGRAM**

1 INTRODUCTION

This document describes the structure, operation, and oversight of the Long-Term Stewardship (LTS) Program for the Argonne National Laboratory-East (ANL-E) site. This program is designed to satisfy requirements related to the management of closed waste sites and former nuclear facilities located on the ANL-E property. These requirements consist of legally binding requirements stipulated by the Illinois Environmental Protection Agency (IEPA) as well as other requirements instituted by the U.S. Department of Energy (DOE) regarding waste site stewardship.

This Program Management Plan (PMP) is the basic management document of the LTS Program and identifies the management organization and responsibilities; implementation approach; control systems to be put in place; and reporting and safety procedures that will be used to manage the program. The primary document used in developing this PMP was the *Argonne National Laboratory (ANL) Project Management Manual (PMM)*. However, the LTS Program will not be managed as a traditional project, since the scope, cost, and schedule are not well defined and the duration is unknown. The project management principles outlined in the PMM were used as a reference in developing the program structure.

2 MISSION OF THE LONG-TERM STEWARDSHIP PROGRAM

The ANL-E LTS Program consists of the set of activities necessary to minimize hazards posed by residual contamination or waste material remaining at sites (or portions of sites) after planned cleanup actions have been completed. These activities include inspection, operation, and maintenance of remedial systems; surveillance and maintenance of former nuclear facilities; environmental monitoring and reporting; performance assessment; information management; contingency planning; and institutional controls. DOE will fund and oversee the program, and various organizations within ANL-E will administer it. LTS activities are designed to ensure that the remedial actions in place remain effective for an extended, possibly indefinite, period of time — until such time that the residual hazard is reduced to levels that allow unrestricted use and unlimited access.

The LTS Program is an element of the larger Environmental Management Program at ANL-E. As such, it is subject to the general Environmental Protection Policy Statement as found in the ANL-E Policy Manual. The LTS mission statement below is consistent with the overall policy statement.

The ANL-E LTS Program will monitor, maintain and enhance (where necessary) protection of public health, safety, and the environment at closed remedial action sites within and adjacent to the ANL-E site that are the result of past ANL-E activities. This mission includes ensuring human and environmental well-being through the reduction of residual risks and the conservation of the site's natural, ecological, and cultural resources. Mission activities will include vigilantly maintaining "post-cleanup" controls on residual hazards; sustaining and maintaining engineered controls, infrastructure, and institutional controls; and periodic reevaluation of remedial actions in response to changes in knowledge, science, technology, site conditions, or regional setting.

3 PROGRAM DESCRIPTION

The establishment and maintenance of a formal LTS Program is the result of DOE directives based on the realization that significant effort will be required for many years to ensure that residual hazards at closed waste sites are properly managed. The cleanup of former waste management units, contaminated areas, and former nuclear facilities resulted in the complete removal of waste materials and contamination from many of these units. A number of units, however, still contain buried solid and liquid waste, contaminated environmental media (soil and groundwater), and contaminated structural materials (concrete floors, walls, piping, etc.). These facilities will require a significant effort to operate and maintain the remedial actions put in place, to monitor for future releases from the units, and to prepare for any emergency release or failure of the units. Such efforts will be required for many years. In addition, a number of sites that contained contaminated media were cleaned to standards that could limit future use of that facility or area. A number of former waste sites were cleaned to risk-based remediation objectives on the basis of industrial/commercial land use scenarios. Several former nuclear facilities were cleaned to "free release" surface contamination levels but still contain activation products or radioactive contamination deep within the material itself. Facilities such as these will require ongoing control over their future use to ensure future users are aware of these contaminants and ensure the proper disposal of materials removed from them.

Long-term stewardship is the set of activities necessary to provide adequate protection of human health and the environment from hazards posed by residual contamination and/or wastes remaining at sites (or portions of sites) once remediation is complete. A site is considered to be in the LTS phase once required remediation (or "cleanup") activities have been completed or, in the case of long-term remedial actions (e.g., groundwater remediation, soil remediation, and landfills), the remedy is shown to be functioning properly and operating as designed. LTS activities are designed to ensure that the implemented remedies remain effective for an extended, or possibly indefinite, period of time — until such time that the residual hazard is reduced such that the site may be released for unrestricted use and unlimited access. The primary elements of the LTS Program at ANL-E include the following:

- Maintain and evaluate the effectiveness of operational remedies (e.g., ground-water collections systems in the 317 and 319 Areas, phytoremediation system,

319 Area Landfill leachate collection system) and manage the wastes associated with the remedies.

- Maintain engineered controls (800, 319, and East-Northeast [ENE] Area landfill caps and 319 Area subsurface barrier wall).
- Maintain, evaluate, and ensure the effectiveness of institutional controls.
- Conduct surveillance and monitoring activities for operational remedies, engineered units, and former nuclear facilities with residual contamination.
- Provide emergency response and corrective action capability, including contingency planning.
- Ensure that health and safety requirements for all on-site workers are met.
- Ensure that personnel resource requirements for the program are met.
- Ensure the preservation and maintenance of relevant records, data, and information.
- Coordinate land use planning for current and future site users.
- Retain and provide appropriate public access to historical and current information and records.
- Provide the opportunity for community awareness and involvement with the LTS Program.

4 MANAGEMENT STRUCTURE AND RESPONSIBILITIES

Responsibility for this program is delegated to ANL-E by the DOE-Argonne Area Office (DOE-AAO) in accordance with its prime contract, W-31-109-ENG-38.

ANL-E management has delegated overall program management, technical oversight, cost, and schedule responsibility for the program to Environment, Safety and Health and Quality Assurance Oversight (EQO) (Note: such delegation has not yet occurred but it is assumed that it will have occurred by the time this document is finalized). The Director of EQO is the functional manager for the program and has further delegated program management responsibility to the LTS Program Manager. LTS activities will be performed with a combination of ANL-E staff from EQO, Plant Facilities and Services (PFS), and, as needed, employees of various other ANL-E divisions. Various approved contractors will also provide services to the program. Appropriate levels of effort from these individuals will be made available to the LTS Program to effectively implement the program requirements. The ANL-E organizations participating in the

LTS Program and their organizational arrangement within ANL-E are shown in the project Organizational Breakdown Structure in Figure 1.

The principal functional areas and organizations that will be participating in the LTS Program and associated LTS responsibilities are as follows:

- LTS Program Manager
 - Request and manage LTS Program funds;
 - Oversee LTS Program Implementation;
 - Provide technical and managerial oversight over the LTS Program;
 - Review and assess monitoring data and other performance indicators;
 - Ensure LTS records are kept up to date;
 - Single point of contact for inquiries into waste site status and historic information;
 - Establish and maintain the LTS Plan for ANL-E;
 - Establish and maintain a LTS information management Web site;
 - Prepare program scope, cost, and schedule plans;
 - Oversee participation of other ANL-E organizational units;
 - Ensure that routine inspection and surveillance of LTS sites are performed; and
 - Ensure that operational remedies are operated and maintained properly and the performance assessed periodically.
- Environmental Monitoring and Surveillance (EQO-EMS)
 - Prepare sampling plans and schedules;
 - Conduct required environmental sampling at all LTS sites;
 - Conduct or arrange for analysis of environmental samples collected;

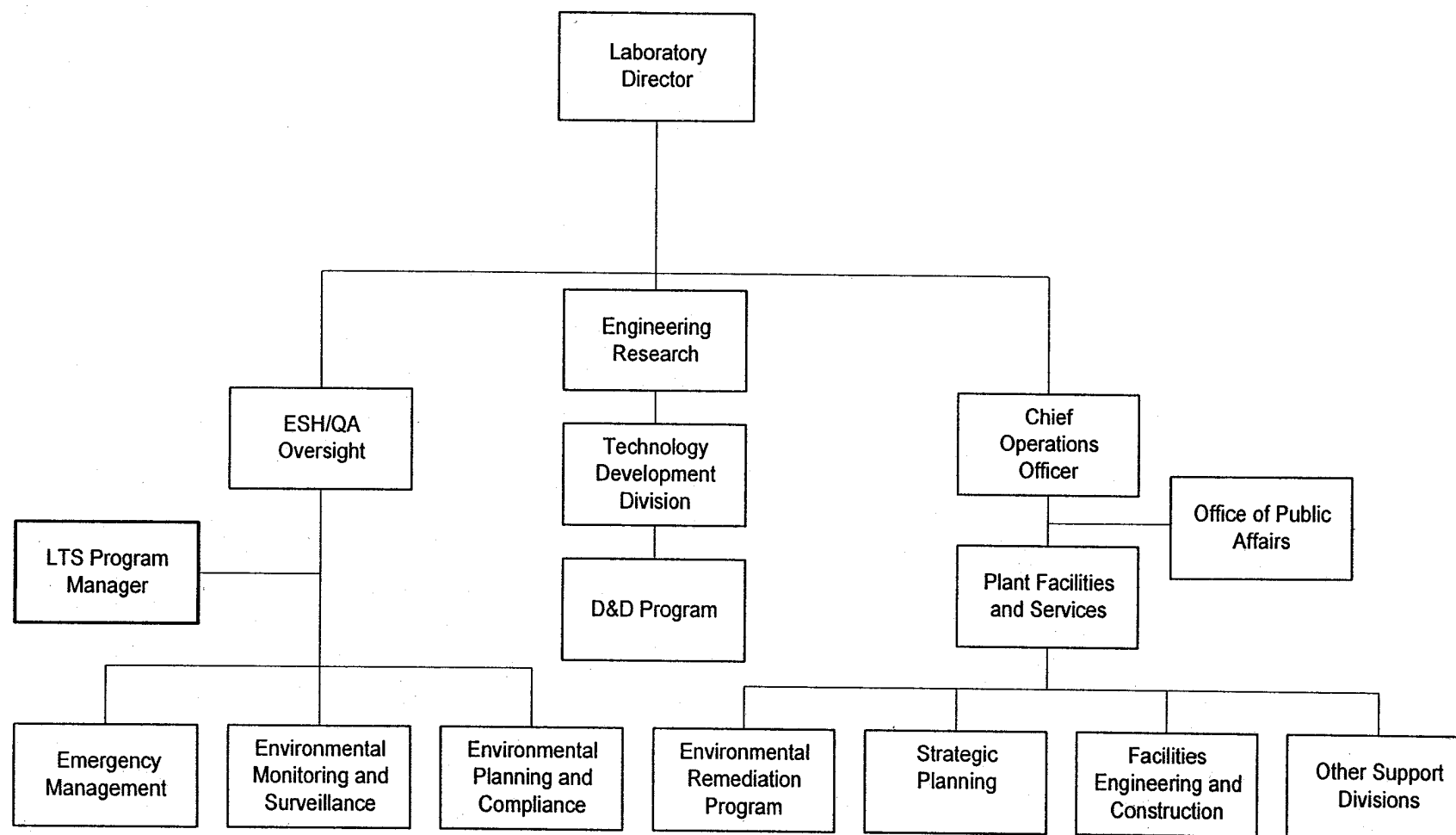


FIGURE 1 Organizational Breakdown Structure for the Long-Term Stewardship Program

- Review analytical results and prepare reports for submission to the IEPA; and
 - Keep monitoring database up to date.
- Environmental Remediation Program (PFS-ERP)
 - Demonstrate that completed actions are operating as designed;
 - Generate documentation to demonstrate compliance with cleanup standards and the nature of any residual contamination;
 - Generate contingency plan for LTS sites; and
 - Transfer historic documents for completed waste site to the LTS Program.
- Decontamination and Decommissioning Program (TD-D&D)
 - Demonstrate that completed facilities are in an industrially safe condition;
 - Generate plans and cost estimates for surveillance and maintenance for completed and incomplete decontamination and decommissioning (D&D) projects;
 - Generate documentation to demonstrate compliance with cleanup standards and the nature of any residual contamination;
 - Transfer historic documents for completed waste site to the LTS Program.
- Environmental Planning and Compliance (EQO-EPC)
 - Review submittals to the IEPA;
 - Review operation and maintenance and monitoring plans;
 - Maintain database on regulatory status of LTS units;
 - Communicate with DOE-AAO and regulatory agencies regarding regulatory issues;
 - Monitor regulatory environment to identify changes that might affect LTS units or the LTS Program; and
 - Assist the LTD Program by conducting landfill inspections preparing reports for submittal to the IEPA and other tasks as requested.

- Emergency Management (EQO-EM)
 - Ensure that the Comprehensive Emergency Management Plan adequately addresses potential releases from or damage to LTS sites;
 - Review LTS Contingency Plan and assist in regular updates of the plan;
 - Communicate the nature of the risk posed by LTS sites to appropriate emergency management personnel; and
 - Participate in any emergency response involving a LTS site.
- Strategic Planning/Program Management (PFS-SP)
 - Integrate knowledge of LTS sites and associated land use restrictions into site land use planning documents;
 - Incorporate and maintain accurate geospatial information about LTS sites in the site's geographical information system (GIS);
 - Convey information about land use restrictions associated with LTS sites to current and future facility planners;
 - Convey information regarding limitations on residual materials disposal (soil, demolition debris, etc.) to future site or facility users; and
 - Ensure that institutional controls (land use restrictions) are complied with.
- Facilities Engineering and Construction (PFS-FEC)
 - Ensure that LTS sites are not disturbed by construction activities without the full knowledge and consent of project personnel the LTS Program Manager and the IEPA (where applicable);
 - Ensure that digging permit restrictions include restrictions on disturbance of LTS sites;
 - Provide technical assistance for modification or upgrade of remedial actions as requested.
 - If requested by the LTS Program Manager, plan and implement major upgrades, repairs, or replacements for current remedial actions; and
 - Plan and implement the demolition of former nuclear facilities that have been declared surplus property.

- Site Services (Grounds) (PFS-SS)
 - Conduct required inspection and maintenance of physical barriers (caps).
 - Ensure that physical institutional controls (fences, signs, etc.) are maintained and repaired or replaced as needed;
 - Ensure that access roads and walkways are maintained to allow access by inspectors and samplers; and
 - Provide assistance to repair damage to landfill caps or other barriers as requested by the LTS Program Manager.
- Maintenance and Crafts (Building Maintenance) (PFS-MC)
 - Conduct required surveillance and maintenance of former D&D sites not returned to the control of the programmatic divisions (Buildings 330 and 301).
 - Ensure that structures under PFS control housing former D&D facilities are structurally sound and leak tight and all required safety and support systems remain functional.
 - Prevent unauthorized access into PFS facilities containing residual contamination.
 - Assist the LTS Program in performing routine preventive and restorative maintenance of operational remedies as requested.
- Office of Public Affairs (OPA)
 - With the assistance of the LTS Program Manager, prepare information suitable for public release regarding the LTS Program;
 - Review technical information prior to making it available to the general public;
 - Facilitate the interaction with the general public in development and implementation of the LTS Program; and
 - Field information requests from the general public related to the former waste sites, obtain a response from knowledgeable persons within ANL-E, and convey the response to the person making the inquiry.

- Programmatic Divisions
 - Provide access to technical experts to assist the LTS Program as needed, and
 - Provide information to the LTS Program Manager about new technology that could improve the LTS Program.
- Director of EQO (EQO)
 - Review and concur with LTS planning documents that impact the day-to-day operations of the ANL-E site;
 - Provide independent management oversight to the LTS Program;
 - Ensure that sufficient funds to support the LTS Program are requested in accordance with the LTS Baseline;
 - Conduct periodic assessments and audits of the LTS Program;
 - Ensure that the LTS Program is effectively integrated into other environmental management functions; and
 - Communicate problems or concerns related to LTS sites to ANL-E and DOE management personnel.
- Director of PFS (PFS)
 - Review and concur with LTS planning documents that impact the day-to-day operations of the ANL-E site;
 - Ensure that participating PFS organizations effectively carry out their delegated responsibilities;
 - Ensure that the LTS considerations are addressed in future land use planning and facility development; and
- Chief Operating Officer for ANL-E (COO)
 - Ensure adequate funding for the LTS Program,
 - Ensure adequate upper level management attention to LTS issues,
 - Review and approve the LTS Plan, and

- Communicate problems or concerns related to LTS sites to ANL-E and DOE management.
- U.S. Department of Energy-Argonne Area Office (DOE-AAO)
 - Provide guidance relative to LTS Program requirements;
 - Review and approve key plans related to the LTS Program, including the LTS Plan;
 - Ensure adequate funding is made available to the LTS Program;
 - Ensure that required institutional controls (deed restrictions, Interagency Agreements, Memoranda of Understanding, etc.) are put in place and maintained; and
 - Ensure that DOE management is informed of the status and issues related to the LTS Program.

Many of the LTS requirements are similar to other ongoing activities and do not represent large commitments of time or money. Many of the participants in the LTS Program will perform their respective duties for the program from within their existing organizations. The LTS Program organization will be minimal, consisting of the LTS Manager and a small number of full- or part-time support staff. The primary role of the LTS Program organization will be to coordinate the efforts of the various participants, both within EQO and other divisions, and assemble, review, and manage information generated by the different functional groups. The LTS Program Manager will also serve as a single point of contact for information about the LTS Program, both internal to ANL-E and external to DOE.

5 WORK BREAKDOWN STRUCTURE

The various tasks involved in the LTS Program are organized into the Work Breakdown Structure (WBS) shown in Figure 2 and Table 1. The WBS Dictionary, which describes the scope of each element, is contained in Appendix A to the LTS Baseline. The planning, management, and implementation of these work elements are accomplished by using the process steps briefly described in the sections below. Table 2 contains the Responsibility Assignment Matrix that defines the roles of the various participants discussed above.

6 RESOURCE REQUIREMENTS

The estimated funding needs and a spending plan for this program are described in the LTS Program Baseline Cost Estimate contained in Appendix B to the LTS Baseline. The

LTS Program activities will be performed by the LTS Program Office with the support of the other program participants on an as-needed basis. The Program Manager will be responsible for requesting and managing the LTS Program budget. Program funds will be allocated to the various participating organizations as needed. The source of funding will be ANL-E overhead funds or direct allocations of funds from DOE (note: funding issue to be resolved before final document is issued). Funding will be requested and allocated through the normal ANL-E budgetary authorization mechanisms.

The cost estimate includes a number of ongoing activities, some of which have been occurring for many years. Many of the activities are already funded and will continue to be funded from overhead funds; others (surveillance and maintenance of incomplete D&D projects) will be funded by EM. Some of the activities are new and require new funding (the source of this new funding had not been determined at the time this preliminary draft plan was prepared).

The Baseline Cost Estimate contains four categories of resource needs: one-time initial setup costs, annual program operations costs, periodic costs that will recur approximately every 5 years, and future final closeout costs. The initial costs represent one-time costs associated with establishing the LTS Program, writing the LTS Plan, developing the information management system, and establishing required institutional controls and other actions. The program annual operations costs represent activities that are required on an ongoing basis as long as the remedial actions are in place and operating. These costs include facility inspection and maintenance; environmental sampling and analysis; maintenance of buildings housing former nuclear facilities; maintaining the information management system; and other annual routine activities. Periodic actions include performing periodic performance assessments and updating the LTS Plan, Contingency Plan, Operations and Maintenance (O&M) Plan, and other documents. The final closeout costs represent one-time costs to be incurred at the end of the remedial actions to remove active remedial equipment, perform final confirmatory sampling and analysis, and restore the sites to a stable condition. They also include the cost of the ultimate demolition of the former nuclear facilities, currently limited to Buildings 330 and 301. These final costs will occur at different times for individual units. In most cases, no date for these activities has yet been determined. The Baseline was prepared on the basis of assumed dates set well out into the future, beyond the planning window. (Note: At the time this document was prepared, cost estimates for the final closeout task had not been prepared. Thus, no cost for that task is included in the Baseline.)

Accountability for requesting adequate funds and for the proper expenditure of LTS Program Funds will rest with the LTS Program Manager. Funds will be dispersed to the participating organizations as needed throughout the year. Nearly all of the funds will be needed by EQO and PFS; thus, these two organizations will be monitored carefully to ensure proper use of the funds provided.

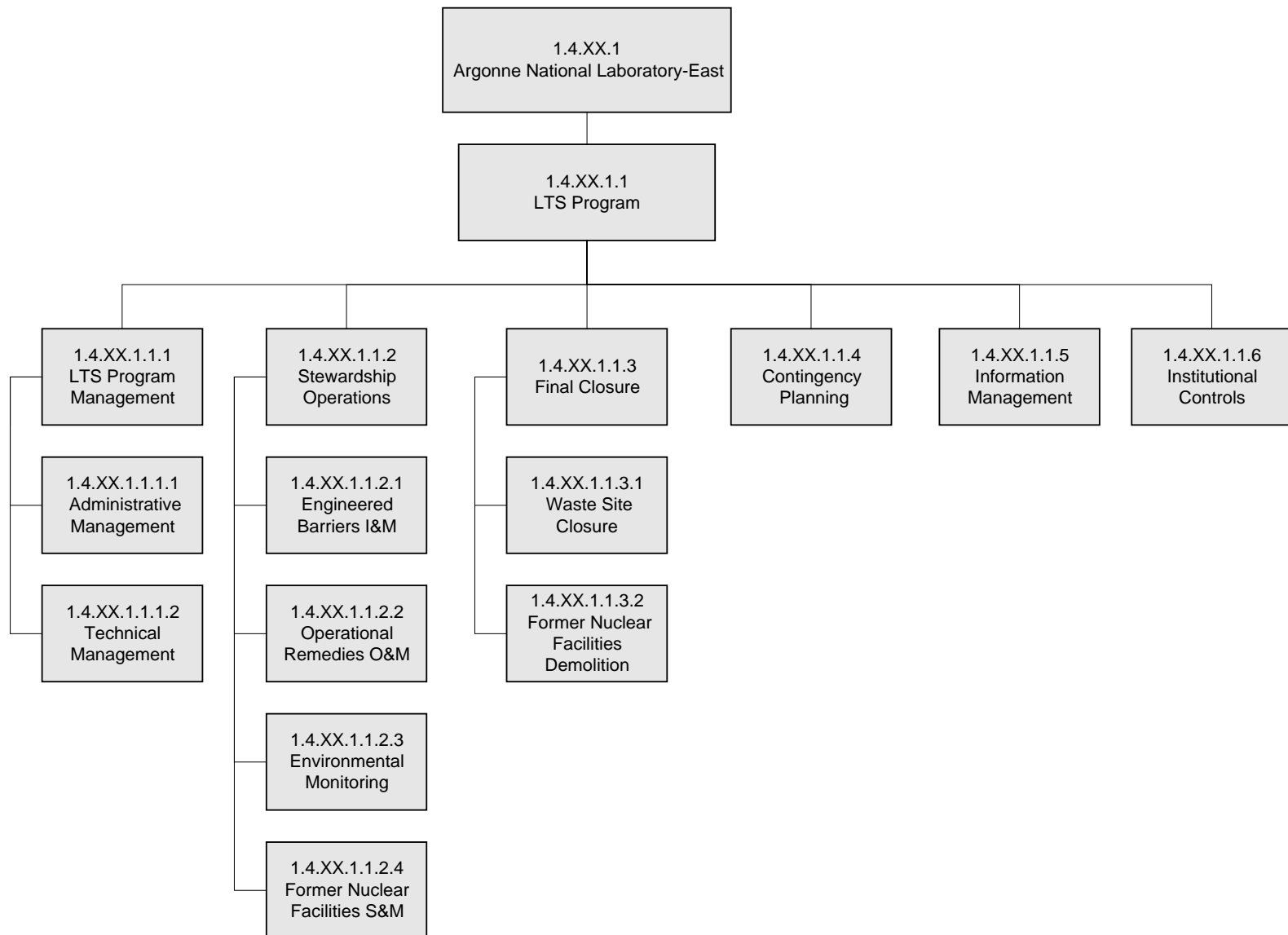


FIGURE 2 Work Breakdown Structure for the Long-Term Stewardship Program for ANL-E

TABLE 1 Work Breakdown Structure Index^a

ANL-E Project Title: Long-Term Stewardship Program for ANL-E								2. Date: April 10, 2002		3. Identification No.	
4. Line No.	5. WBS Elements							6. Participant WBS Element Code	7. Budge and Reporting No.	8. Phase	9. Other
	Indenture Level						Title				
	1	2	3	4	5	6					
1	X						DOE Office of Science				
2		X					DOE Office of Laboratory Operations and ESH				
3			X				Chicago Locations				
4				X			Argonne National Laboratory East				
5					X		LTS Program Management				
6						X	Administrative Management				
7						X	Technical Management				
8					X		Stewardship Operations				
9						X	Engineered Barriers I&M				
10						X	Operational Remedies O&M				
11						X	Environmental Monitoring				
12						X	Former Nuclear Facilities S&M				
13					X		Final Closure				
14						X	Waste Site Closure				
15						X	Former Nuclear Facility Demolition				
16					X		Contingency Planning				
17					X		Information Management				
18					X		Institutional Controls				

^a Abbreviations: ESH = Environment, Safety and Health; I&M = inspection and maintenance; S&M = surveillance and maintenance.

TABLE 2 (Cont.)

Function		EQO-LTS ^b	EQO-EMS	EQO-EPC	EQO-EM	PFS-ERP	PFS-SP	PFS-FEC	PFS-SS	PFS-MC	OPA	TD-D&D	Prog. Div.	Dir. EQO	Dir. PFS	COO	DOE-AAO
Former Nuclear Facilities S&M ^c																	
	S&M plans and procedures	R		R						P		S		R	R		R
	Facility surveillance	R								P							
	Facility maintenance	R							P	P							
	Institutional controls maintenance	R					S		P	P							
Final Closure		P	S	S				S						R	R	R	R
Contingency Planning																	
	Emergency response planning	S			P	S			S	S		S		R	R		R
	Contingency plan	A	S	S	R	P		S	S	S		S	S	R	R	R	R
Information Management																	
	LTS Information management Web Site	P	S	S	S	S					S	S	S	R	R	R	R
	Administrative record management	P		S		S						S					
	Historic documents	P	S	S		S						S	S				
	Progress reports	S	P	S		S							S				
	Monitoring data	R	P	R							R		S	R	R	R	R
	Information access	P									R		S	R	R	R	R
Institutional Controls																	
	Land use planning and control	S				S	P	S				S		R	R	R	A
	Institutional land use controls	S		S		S	P	S	S					R	R	A	A
	Residual disposal cautions and procedures	S		S		S	S	P	S			S		R			

^a A = approval authority; P = primary responsibility; R = review; S = support.

^b Organization acronyms: COO = Chief Operating Officer; D&D = Decommissioning and Decontamination Program (TD); DOE-AAO = DOE-Argonne Area Office; EM = Emergency Management (EQO); EMS = Environmental Monitoring and Surveillance (EQO); EPC = Environmental Planning and Compliance (EQO); EQO = Environmental Protection, Safety and Quality Assurance Oversight; ERP = Environmental Remediation Program (PFS); FEC = Facilities Engineering and Construction (PFS); MC = Maintenance and Crafts (PFS); OPA = Office of Public Affairs; PFS = Plant Facilities and Services; SP = Plant Facilities and Services Site Planning; SS = Site Services (PFS).

^c Abbreviations: I&M = inspection and maintenance; O&M = operation and maintenance; S&M = surveillance and maintenance.

7 PROGRAM TECHNICAL SCOPE, SCHEDULE, AND COST BASELINES

The LTS Program Baseline consists of descriptions of the technical scope, schedules, and cost estimates for the anticipated work. The Baseline for the LTS Program is contained in Appendix A. The LTS Program is unique in that the end point for the program is not defined at this point in time. By definition, LTS activities will be required until the remedial action sites are suitable for unrestricted use and unlimited access. For sites such as the three landfills, this condition will never occur, unless the waste materials are removed at some point in the future. Thus, some aspect of the program will probably continue indefinitely. Other aspects of the program will have a defined end point, albeit the time when this end point will occur is not yet known.

Baseline LTS elements include routine actions that occur according to a regular annual schedule (typically quarterly or semiannually) as well as periodic actions that occur less often, such as the performance assessment that will reoccur on a 5-year cycle. Still other activities will not occur until some time in the future, which is as yet unknown. In developing the Baseline, every effort was made to anticipate future resource needs; however, because of the long time frame involved and the uncertainty associated with many event time lines, the degree of certainty of the baseline is low. The schedule and cost baselines should be viewed in light of this uncertainty.

To improve the reliability of the Baseline, it is broken into two elements: one represents the entire program and the other represents a 5-year planning window. The latter is a subset of the former but is developed in more detail and has lower uncertainty. Table 3 lists the activities that fall within the initial planning window (fiscal year [FY] 2004–FY 2008) as well as those that will occur in the out-years (beyond FY 2008). The Baseline contains an updated, detailed schedule and cost plan for the planning window activities. Because the level of certainty associated with out-year activities is low, no attempt will be made to generate a detailed schedule for these activities. Subsequent revisions to the Baseline will contain updated planning window schedules.

8 BASELINE CHANGE CONTROL

The LTS Program Baseline is based on numerous elements that are not well known or that are likely to change over time. Thus, significant modifications to the Baseline are expected on a regular basis. To manage and track these changes, a Baseline change control process will be implemented.

Baseline changes will occur in one of two ways. The Planning Window Baseline will be updated annually and the planning window advanced 1 year. At that time, any changes to the program scope, cost, or schedule for activities expected to occur within the 5-year planning window will be made and the baseline documents revised. Prior cost estimates will be

TABLE 3 Planning Window and Out-Year Activities^a

Activity	Planning Window FY 2004–FY 2008 Activity	Out-Year Activity
Technical Management		
Overall performance assessments	X	X
Risk assessment	X	
Review and update risk assessment and LTS plans		X
General Technical Management	X	X
Administrative Management		
Transition Planning	X	
Project Management Plan Preparation	X	
General Administrative Management	X	X
Stewardship Operations		
Engineered barriers I&M	X	X
Operational remedies O&M		
Phytoremediation System O&M	X	X
317 Extraction System O&M	X	X
319 Extraction System O&M	X	X
Environmental Monitoring	X	X
Monitoring program start-up		
Integrated O&M Plan Preparation	X	
Develop common database	X	
Develop monitoring systems Web site	X	
Former Nuclear Facilities S&M	X	X
Final Closure		
Final closure and demolition planning	X	
Site closure		X
Facility Demolition		X
Contingency planning		
Contingency plan	X	
Emergency response planning	X	
Review and update contingency plans		X
Information Management		
Establish Administrative Record	X	
Establish Historic Documents Library	X	
Develop Information Management Web site	X	
Maintain and update documents	X	X
Institutional Controls		
Land use planning and control	X	X
Institutional land use controls	X	X
Residual disposal cautions and procedures	X	X

^a Abbreviations: I&M = inspection and maintenance; O&M = operation and maintenance; S&M = surveillance and maintenance.

reviewed and updated with more detailed and reliable estimates. The Life-Cycle Baseline will also be updated annually. The revised LTS Baselines will be submitted to the participating organizations, the PFS and EQO Directors, and DOE for approval.

In addition to the routine updates, from time to time the need may arise to modify the Baseline between annual updates. The need for program changes will be identified as a result of program monitoring by the LTS Program Manager or other participants in the program. Reasons for such a change would be major failure in one or more remedial actions, discoveries of new contamination that requires unplanned remedial actions, changes in regulatory requirements or other significant events beyond the control of the program. Only major changes to the program ($\pm 20\%$ of annual budget) will require a mid-year Baseline change. Minor changes will be addressed as a variance.

9 RISK MANAGEMENT

The likelihood that actual performance will vary from the original Baseline is great because of the length of time this program will be in effect and the level of uncertainty of many program elements. The following are the major areas of uncertainty:

1. Length of specific LTS activities – The length of time the various remedial actions will need to operate (phytoremediation, groundwater hydraulic containment, leachate collection, former nuclear facility surveillance and maintenance, etc.) is not precisely known. For the 317 Area, the primary uncertainty is related to the rate of destruction or removal of volatile organic compounds by the phytoremediation system, augmented by natural attenuation. Currently, there is insufficient experience with this system to project the time needed to achieve the remediation objectives, at which time the systems could be shut down.
2. Scope of monitoring activities – The monitoring programs will continually be reassessed and modified as monitoring data are generated and site conditions change. As a result, periodic modifications to the program, resulting in changes to the Baseline, will be required on a regular basis.
3. Regulatory requirements – From time to time, the regulatory requirements that govern the LTS Program may change. These changes are unpredictable and could have a major impact on the program.
4. Final remediation objectives - The IEPA has provided remediation objectives for the soil and groundwater in the 317/319 Area; however, several of these seem to be overly conservative. DOE has expressed its intent to pursue alternate remediation objectives based on a site-specific risk assessment. Until this issue is resolved, it is impossible to predict how long remediation will need to continue in this area.

5. Final site closure requirements – Several major efforts will be required at some point in the future to completely close out the remedial actions. These actions include removal of wells, removal of phytoremediation trees, and demolition of former nuclear facilities. The scope and cost of these future actions are not well known.
6. Periodic system upgrades and major repairs – As the program proceeds, there will undoubtedly be situations that will require significant modification to the existing remedial system because of the development of improved remedial technology, the discovery of significant failure of a remedial system, or the discovery of a previously unknown release or source of contamination. These events are not included in the Baseline but will be dealt with as the need for such an effort arises.

These high risk factors may result in significant deviations from the actual cost and schedule performance as compared with the Baseline. These deviations will be documented as variances from the Baseline or will be incorporated into the Baseline through the Baseline Change Control process.

10 CONTROL SYSTEMS

The LTS Program will be managed in a way similar to the project control procedures documented in the ANL-E PMM. However, since the program is not a well-defined project, the procedures in the PMM will serve as a guide rather than requirements. They will be applied to the program to the degree that they contribute to the proper management of the LTS Program. The applicable PMM principles that will be applied include establishment of accountability for work functions; establishment of technical, cost, and schedule baselines; and development of a Program Management Plan (this document).

The program controls being implemented are sufficient to satisfy management oversight for an ongoing program with high degrees of uncertainty. These controls include a detailed program Baseline for the planning window, with a less detailed Baseline for the entire program; formal assignment of responsibility; progress reporting mechanisms; and financial accountability and schedule monitoring. Various components of the control system are briefly discussed in the following sections.

10.1 COST CONTROL

The funding for the LTS Program will flow through the LTS Program to the various participating organizations. A cost account structure will be developed, which will allow for tracking of spending for these activities.

The Baseline for the Environmental Remediation Program identifies the funding profile for each fiscal year within the planning window. This funding profile will be updated annually. Because most activities are routine, repetitive activities, the spending plan will be level loaded, with equal amounts budgeted for every month. As a result, no month-by-month spending plan will be generated. The anticipated spending for the one-time start-up activities and discrete activities that happen on a periodic basis, as well as one-time future activities, will be included in the cost plan during the year these activities are assumed to occur.

Obtaining the necessary funds as outlined in the Baseline will be the responsibility of SC. Ensuring that the funds are appropriated for the LTS Program and used efficiently and properly will be the responsibility of ANL-E management. Deviations from the anticipated level of spending will be communicated to the LTS Program Manager in a timely manner so the problem can be resolved without impacting the program. Earned-value reporting methods discussing cost and schedule performance as compared to the LTS Cost Plan will not be used since most tasks will be level-loaded.

10.2 SCHEDULE CONTROL

The program schedule is contained in the Baseline in Appendix A. A detailed schedule was prepared for the LTS activities to be performed during the planning window only. Most routine activities are cyclical, without a firm start and finish date. These are shown as continuous activity bars on the Gantt chart. Discrete activities are shown on the Gantt charts as shorter activity bars. To properly manage LTS activities, the participating organizations will develop their own internal detailed schedules that they will update on a regular basis. The status of completed events as compared with the schedule will be monitored by the LTS Manager as well as managers of specific tasks (inspections, surveillance and monitoring program managers), by comparing actual performance with these detailed schedules. Significant variance from the schedule will be discussed with the LTS Program Manager and appropriate responsible participants to effect corrective actions for the schedule problem. Schedule problems that cannot be resolved without the participation of ANL-E or DOE managers will be communicated to management through the normal channels. No routine report discussing schedule performance will be generated. Because of the routine, repetitive nature of most of the LTS Program activities, a set of schedule milestones was not developed.

LTS activities that occur outside of the planning window are not included in the planning window schedule. The Baseline contains a less detailed schedule containing the out-year activities; however, this is included for planning purposes only since the degree of uncertainty associated with the out-year activities is significant. The out-year events will be reassessed each year to determine if the degree of uncertainty can be reduced. As the planning window advances over time, some of the out-year activities will move within the window. When this occurs, a detailed schedule will be developed and included within the Gantt chart.

10.3 TECHNICAL CONTROL

Changes to the LTS program requirements or implementation plans or procedures will occur for various reasons, including changed site conditions, changed regulatory requirements, identification of more efficient ways to perform the work, or new discoveries related to the LTS sites. Such changes will typically require prior approval by the IEPA and/or DOE before they can be implemented. Prior to submitting a request for approval of any such changes to regulatory-driven LTS activities, the proposed changes will be reviewed and approved by the LTS Program Manager, EQO compliance experts, and ANL-E and DOE management. This review and approval process will provide sufficient control over the most important elements of the LTS Program. Changes to other portions of the program that do not require IEPA or DOE approval will be discussed with affected ANL-E and DOE management prior to their implementation. The effects of any such changes will be reflected in the annual update to the Planning Window Baseline.

11 INTEGRATED SAFETY MANAGEMENT PLAN

The anticipated routine LTS activities are all relatively low risk; however, what risks do exist will be minimized by conducting the work in accordance with Integrated Safety Management (ISM) principles. From time to time, more intrusive, potentially hazardous actions may be carried out. The latter activities could involve the use of contractors as well as ANL-E personnel. Both routine and nonroutine LTS activities will be executed in compliance with the ANL-E Environment, Safety and Health (ESH) Manual established by ANL-E's ESH policies, work rules, and safe practices as they apply to work performed by oneself or personnel under supervision. ISM core functions and guiding principles are incorporated into project activities and followed for all project work as follows:

Define work scope: Routine work practices will be defined in various work plans and written procedures. Nonroutine work will be defined in work plans describing that particular task. The expertise of various safety and environmental professionals will be sought as work is planned. As the procedures for the various activities are devised, the counsel of various professionals may be sought again both formally (through document reviews) and informally to ensure that any necessary process changes or risk mitigation measures are identified and correctly incorporated in the procedures.

Analyze the hazards: During formal and informal consultations, the advice of ANL-E safety personnel will be sought to assist in identifying hazards that are not readily apparent to the untrained eye. This consultation may result in changes to approaches and procedures that result in better and more efficient means of completing the work.

Develop and implement hazard controls: The culmination of the planning processes (the first two core functions) will result in identifying those areas where controls are necessary. At this point, formalization of control will occur by incorporating the necessary controls into the various work plans and oversight and approval of any safety plan prepared by contractors

(contractor safety plans). ESH Job Safety Analysis plans will be completed that meet the requirements of the Laboratory's Construction Safety Program. These plans also include environmental controls as well (i.e., erosion control plans). For contract work, prebid meetings and preconstruction meetings will aid in ensuring that all work is performed safely. A single Job Safety Analysis Plan will be prepared for all routine repetitive activities that are included in the LTS Program. For nonroutine activities, job-specific Safety Analysis Plans will be prepared.

Perform work within controls: For routine work, all workers will be required to read the approved work plans and procedures that include appropriate safety-related information. For nonroutine activities, all workers will be required to read and sign their respective job-specific ESH plan. Supervisory personnel from the participating organizations will be tasked with ensuring that work activities meet the requirements spelled out in the work plans or ESH plans.

Provide feedback and continuous improvement: Feedback will be provided both formally and informally within the organization and between any contract personnel. Informal feedback will occur during and after the work by direct conversations with the employees or contract personnel regarding the conduct of the work and any ways to improve safety or productivity. A formal process will be engaged whereby feedback will be provided in a written form as a "Lessons Learned" memo following completion of a significant nonroutine activity. These memos will be distributed among LTS participants as they become available.

APPENDIX A:

BASELINE FOR LONG-TERM STEWARDSHIP AT ANL-E

ARGONNE NATIONAL LABORATORY-EAST

DRAFT

**Baseline for Argonne National Laboratory-East
Long-Term Stewardship Program
FY 2004 through FY 2008**

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NOTATION

The following is a list of the acronyms and abbreviations used in this report.

ANL-E	Argonne National Laboratory-East
CEMP	Comprehensive Emergency Management Plan
D&D	decontamination and decommissioning
DOE	U. S. Department of Energy
EM	DOE Office of Environmental Management
EMS	Environmental Monitoring and Surveillance
EQO	Environment, Safety and Health/Quality Assurance Oversight (organization)
FY	fiscal year
IEPA	Illinois Environmental Protection Agency
I&M	inspection and maintenance
LTS	long-term stewardship
O&M	operation and maintenance
PFS	Plant Facilities and Services Division
PMP	Program Management Plan
SER	Site Environmental Report
WBS	work breakdown structure

DRAFT
BASELINE FOR ARGONNE NATIONAL LABORATORY-EASAT
LONG-TERM STEWARDSHIP PROGRAM

1 INTRODUCTION

This document constitutes the Baseline for the Long-Term Stewardship Program (LTS Program) for Argonne National Laboratory-East (ANL-E). It contains information describing the scope of the program, the estimated cost of the program, and a schedule for program activities. The Baseline will constitute the primary planning document for the program. U.S. Department of Energy (DOE) approval of the Baseline conveys the authorization to proceed with the work as planned, subject to the allocation of the funding identified in the spending plan.

2 BASELINE STRUCTURE AND CONTENT

This document describes the basic elements of the LTS Program and was prepared in accordance with the April 2001 DOE guidance relative to LTS implementation plans. The technical scope included in this baseline is based on satisfying requirements originating from several sources. These sources include:

- Regulatory (Illinois Environmental Protection Agency [IEPA] and DOE) requirements in various work plans, reports, and regulatory correspondence, and DOE orders and other sources;
- DOE guidance regarding preparation of a LTS Plan; and
- The document entitled *Site-Specific Requirements in Support of LTS Transfer for ANL-E*.

No attempt was made to prioritize the various requirements included in the scope. All activities are considered necessary and of equal importance.

The need for a Baseline for the LTS Program was identified in the December 2000 memorandum (Glauthier memorandum, December 15, 2000) from the Deputy Secretary of Energy in which the LTS Program for DOE facilities was defined. According to this memorandum, the Baseline is intended to “describe the scope of LTS Program Management, the baseline technical activities and the projected schedule, with expected costs.”

The structure of this Baseline is generally consistent with a typical project management baseline as described in the ANL-E Project Management Manual. It consists of three main elements: Technical Baseline, Cost Baseline, and Schedule Baseline.

The LTS Program will be formed by the aggregation of a number of existing routine activities (many of which are currently being performed by other organizations within ANL-E); several new, one-time activities needed to establish the LTS Program in accordance with DOE guidance; and several future activities that are needed to effectively close out phases of the LTS Program after remediation objectives have been fully met. It does not have a well-defined starting and ending point, and the scope is likely to change many times during the life of the program. Because the length of time during which ongoing routine activities will be needed is not known, and the point in time when the future final closure activities might be needed is not yet known, it is not possible to develop a detailed schedule for the entire program. Similarly, the work scope of many of the elements is not precisely defined; it will not be defined for many years while ongoing remedial actions proceed. In addition, the work scope is likely to change many times over the life of the program. As a result, complete, accurate cost estimates for the entire program cannot be developed at this point in time. Because of the uncertainty related to the program schedule and cost, some project management tools described in the ANL-E Project Management Manual, such as earned value reporting and careful cost and schedule control techniques, will not be utilized by the LTS Program. These management tools require a well-defined scope and schedule to be effective. Typical project management principles and methods will be utilized only to the extent that they are useful in defining the LTS Program.

Some significant deviations from typical project management principles were used to develop this Baseline. One of the most significant deviations was the use of a “planning window.” The planning window is a rolling 5-year period within which the work scope can be defined relatively accurately, and meaningful cost estimates and schedules prepared. Each year the planning window period will be incremented 1 year, and the scope, cost estimates, and schedules for activities that fall within this 5-year period will be updated to respond to changes or updated information and to incorporate tasks that did not fall within the previous planning window but that will occur within the new planning period.

As a result of this planning window approach, a life-cycle Baseline cost estimate and schedule are not provided in this Baseline. For planning purposes, a partial long-range cost estimate and schedule are included. The long-range cost estimate includes all LTS activities that have been planned to a sufficient degree that cost estimates could be prepared. However, the scope and cost estimate for many of the out-year activities (those that fall beyond the end of the 5-year planning window) are sufficiently uncertain that this estimate should be considered an order-of-magnitude planning estimate only and not a part of the Baseline. In addition, several major future tasks (final closure of remediation sites and demolition of the former nuclear facilities) have not yet been planned, and no cost estimate has been prepared.

A second significant deviation was the use of flat spending profiles for most of the LTS activities. Since the majority of the cost associated with this program is routine, repetitive work that is completed on a quarterly or semiannual schedule, the monthly spending rate will be relatively constant. The spending plans contained in this document are based on level-loading of cost for these repetitive activities throughout the planning window. As a result of this approach to cost loading, earned value performance monitoring will not yield meaningful results, since the status of almost all activities will be based on level of effort (percent complete set equal to the fraction of the fiscal year that has passed) rather than tracking and noting when specific tasks

have been accomplished. Progress reporting will be limited to comparing actual expenditures with the budgeted amount.

3 TECHNICAL BASELINE

The LTS Program is limited to activities conducted for the closed waste sites and former nuclear facilities listed in Tables 1, 2, and 3. As the LTS Program progresses, it is likely that this list of sites will change, as some sites become completely free of contamination, and currently active contaminated facilities are closed and either move into active remediation or enter the surveillance and maintenance phase. It is also possible that previously unknown contaminated areas or facilities will be discovered or new contaminated areas will be created by spills or leaks of hazardous materials. This list of sites, and associated work scope, will be reviewed and updated annually.

The technical scope of the LTS Program consists of a set of related activities, including one-time start-up activities, routine repetitive activities that occur each year, periodic activities that occur approximately every 5 years, and one-time future closure activities. These activities are all designed to minimize the risk associated with residual waste materials at closed remedial action sites. This goal is accomplished in a variety of ways. The principal activities include the following elements.

- LTS Program Management,
- Stewardship Operations,
- Final Closure,
- Contingency Planning,
- Information Management, and
- Institutional Controls.

Figure 1 contains a Work Breakdown Structure (WBS) diagram of the principal elements and several subelements. Table 4 contains the WBS Index. Detailed descriptions of the scope of each of the work elements and subelements are contained in the WBS Dictionary contained in Appendix A of this report.

3.1 LTS PROGRAM MANAGEMENT

This element consists of a number of tasks required to properly manage the LTS Program. This element is based on the assumption that LTS activities will be integrated into

TABLE 1 Summary of Former Waste Sites Requiring Long-Term Stewardship

SWMU No.	Description	Residual Contamination	LTS Activity			
			Inspection	Operation	Maintenance	Monitoring
1	Facility 318 Compressed Gas Cylinder Burial	Hazardous compressed gases	X		X	
2	319 Area Landfill	Solid and hazardous waste, hydrogen-3	X	X	X	X
4	800 Area Landfill	Nonhazardous solid waste, hydrogen-3	X		X	X
11	317 Area French Drain	VOCs ^a in soil and groundwater	X	X	X	X
13	317 Area East Vaults Footing Drain	Partly sealed, rest will stay in operation				X
18	319 Area French Drain	VOCs in waste and groundwater	X	X	X	X
19	ENE 319 Landfill	Nonhazardous solid waste	X		X	X
20	800 Area French Drain	VOCs in waste and leachate, some hydrogen-3	X		X	X
AOC-C	800 Area Landfill Leachate Seep	Part of 800 Landfill (Seeps no longer exist)				
AOC-G	Off-Site Seep	VOCs and hydrogen-3 off-site				X
NA ^b	317 Area North Vault	Buried concrete with radioactive contamination				X
NA	317 Area Deep Vault	Buried concrete with radioactive contamination				X
NA	Former South Vaults	Buried concrete with radioactive contamination				X

^a VOC = volatile organic compound.

^b NA = not applicable.

TABLE 2 Former Waste Sites Requiring Only Information Management^a

SWMU No.	Description
5	East Area Sewage Treatment Sand Filter Beds
6	FEUL Settling Pond
7	Freund Pond
8	Lime Sludge Pond
9	Building 108 – Equalization Pond
12	317 Area Map Tube Vault
21	Laboratory Sewer
104–106	Laboratory Retention Tanks (Bldg. 310)
132	Sanitary Sewer
133	570 Area – Unlined Holding Basin
134	570 Area – Laboratory Wastewater Sludge Drying Beds
136	570 Area – Sanitary Wastewater Sludge Drying Beds
137	Canal Water Treatment Plant Settling Ponds
138	East Area Sanitary Sewers
142	East Area Burn Pit
146	A ² R ² Reactor Excavation Fill
148	South of 381 – Ravines Filled with Trash
150	Bldg. 34 Mixed Liquid Waste Treatment
151	Bldg. 330 Yard with Mixed Materials for Decommissioning
152	Waste Oil Storage Area
159	Waste Oil SAA (B-205)
161	Waste Oil SAA (B-208)
162	Waste Oil SAA (B-211)
163	Waste Oil SAA (B-212)
170	Waste Oil Satellite Accumulation Area (Bldg. 815)
175	Boiler House Spent Sorbent Silo
176	Scrap Metal Storage West of Bldg. 827
177	Boiler House Ash Silo
178	360 Area Fenced Low-Level Radioactive Staging Area
179	Storm Sewers – Cooling Tower Wastewater
180	Scrap Disposal Staging Area East of 377 Cooling Towers
182	Waste Oil Spread on Roads
498	319 Area Shooting Range
693	Bldg. 24 Former Boiler House Pit
694	Bldg. 108B - Baghouse Unit
721	Laboratory Retention Tank Sump (Bldg. 310)
725	Central Boiler House Ash Loader
736	800 Area Non-PCB Transformer Storage Pad
744	Newly Identified Suspected Solid Waste Landfill
745	Bldg. 214 Sump
AOC-B	AOC-B 800 Area Landfill Wetland Area
AOC-F	AOC-F Contaminated Soil near Bldg. 827
AOC-H	AOC-H Contaminated Soil near Bldg. 24

^a Abbreviations: AOC = Area of Concern; A²R² = Argonne Advanced Research Reactor; FEUL = Fossil User's Laboratory; PCB = polychlorinated biphenyl; SAA = Satellite Accumulation Area.

TABLE 3 Former Nuclear Facilities Requiring Long-Term Stewardship

Description	Current status	Residual Contamination	Surveillance	Maintenance
Completed D&D Projects Requiring Long-Term Surveillance and Maintenance				
Bldg. 200 M-Wing Hot Cells (partial decon. only)	Active facility	Further decontamination required, unit managed by the Chemistry Division	X	X
Bldg. 330, CP-5 Reactor	Unused, in S&M ^b	Hydrogen-3 in concrete, other radioactive contamination in inaccessible areas	X ^a	X
Incomplete D&D Projects Requiring Surveillance and Maintenance				
Bldg. 315 ZPR, Cells 6 and 9	Characterization only, in S&M	Unknown residual contamination	X	X
Bldg. 301 Hot Cells	Halted, in S&M	Unknown residual contamination	X	X
Bldg 335 (Juggernaut)	Characterization only, in S&M	Unknown residual contamination	X	X
Completed D&D Projects Requiring Only Records Retention				
Bldg. 316 ATSR Reactor	Office/lab space	Surfaces cleaned, cesium-137 under floor		
Bldg. 597 Ion Exchange Building	Demolished	No contamination remains		
Bldg. 211 60-in. Cyclotron	Office/lab space	Activated concrete and contamination in inaccessible areas remain		
Bldg. 310 Retention Tanks	Ongoing	Surfaces cleaned, may be volume or soil contamination under floor		
Bldg. 202 JANUS Reactor	Sealed off	Activated bioshield remains		
Bldg. 331 EBWR Reactor	Waste storage	Activated bioshield remains		
Bldg. 314 Fast Neutron Generator	Storage	Surfaces cleaned, may be volume contamination		
Bldg. 212 Plutonium Glove boxes	Office/lab space	Surfaces cleaned, glove boxes removed		

^a Surveillance of the CP-5 reactor included a program of monitoring groundwater in the vicinity of the structure. This monitoring is part of the site-wide monitoring and surveillance program.

^a S&M = surveillance and maintenance.

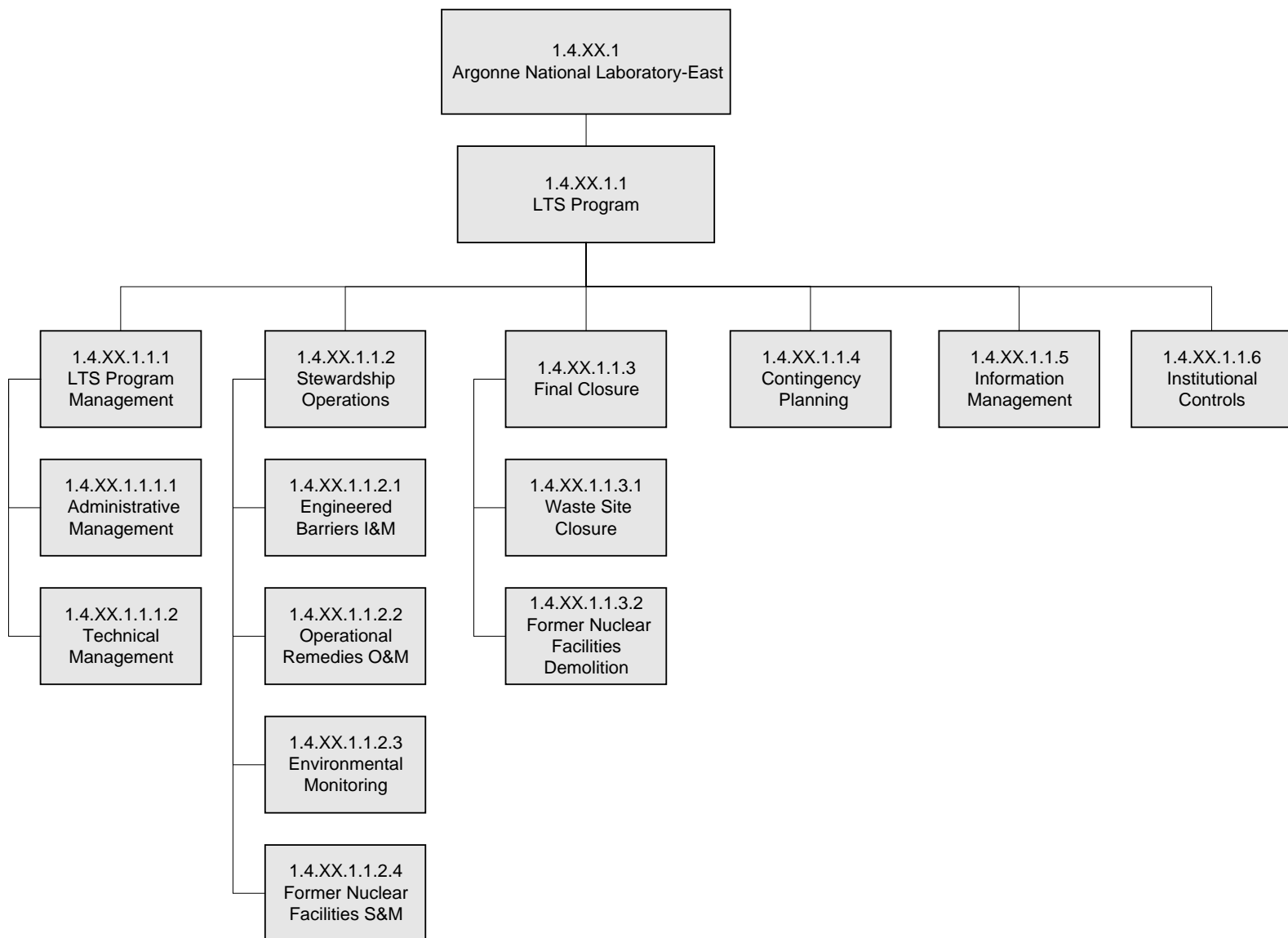


FIGURE 1 Work Breakdown Structure for the ANL-E Long-Term Stewardship Program

TABLE 4 Work Breakdown Structure Index^a

ANL-E Project Title: Long-Term Stewardship Program for ANL-E								2. Date: April 10, 2002		3. Identification No.	
4. Line No.	5. WBS Elements							6. Participant WBS Element Code	7. Budge and Reporting No.	8. Phase	9. Other
	1	2	3	4	5	6					
1	X						DOE Office of Science				
2		X					DOE Office of Laboratory Operations and ESH				
3			X				Chicago Locations				
4				X			Argonne National Laboratory East				
5					X		LTS Program Management				
6						X	Administrative Management				
7						X	Technical Management				
8					X		Stewardship Operations				
9						X	Engineered Barriers I&M				
10						X	Former Nuclear Facilities S&M				
11						X	Operational Remedies O&M				
12						X	Environmental Monitoring				
13					X		Final Closure				
14						X	Waste Site Closure				
15						X	Former Nuclear Facilities Demolition				
16					X		Contingency Planning				
17					X		Information Management				
18					X		Institutional Controls				

^a Abbreviations: ESH = Environment, Safety and Health; I&M = inspection and maintenance; O&M = operation and maintenance; S&M = surveillance and maintenance.

existing organizational structures and elements wherever possible. However, the existence of a Program Management Office, which will coordinate the work and assist the diverse groups in completing required activities, is assumed. Program management activities fall into two types, technical and administrative. The technical elements include such activities as performing periodic performance assessments, coordinating planning for future waste site closure and nuclear facility demolition, conducting and updating risk assessments for residual contamination, interacting with regulatory agencies and other stakeholders on the status of the LTS Program, and assisting ANL-E management in land use planning efforts. Administrative duties include assisting with the transition of the LTS Program from the DOE Office of Environmental Management (EM) to the DOE Office of Science (SC), preparing and updating the Program Management Plan, assisting in obtaining and deploying the necessary resources to allow the program to function, delegating elements of the program to participating organizations, monitoring the progress of LTS activities, and preparing progress reports to ANL-E and DOE managers.

3.2 STEWARDSHIP OPERATIONS

The Stewardship Operations Task includes the bulk of the day-to-day activities necessary to ensure that residual contamination is adequately protected and that ongoing remedial actions continue to function as designed. These activities will be performed by several different organizations within ANL-E. The Stewardship Operations Task consists of the following subtasks.

- Engineered barriers inspection and maintenance,
- Operational remedies operation and maintenance,
- Environmental monitoring, and
- Former nuclear facilities surveillance and maintenance.

These tasks are relatively complex and will involve a number of different ANL-E personnel, contractors, and other resources. The majority of these efforts follow routine repetitive schedules; however, several one-time tasks necessary to initiate the LTS Program are included. These one-time tasks include the development of a single integrated database for all environmental monitoring data; development of an Internet-based Web site to assist in the management and analysis of monitoring data; and the production of an up-to-date plan for operation, maintenance, and monitoring activities.

3.3 FINAL CLOSURE

The final closure element consists of several future tasks required to terminate ongoing remedial actions at former waste sites, restore the sites to natural conditions, and demolish former nuclear facilities. None of these activities have yet been planned or scheduled. It is likely

that these actions will not occur for at least 10 to 20 years, if not longer. They are included in the Baseline as future work that will occur in the out-years, well beyond the planning window. Since no cost estimate has been performed, the cost of these activities is not included in the long-range planning estimate.

3.4 CONTINGENCY PLANNING

DOE guidance stipulates that a written contingency plan be prepared for closed waste sites. Preparing such a plan is included in this work element. Two types of potential failures will be addressed. First, potential catastrophic failures resulting from fires, floods, tornadoes, or similar events will be addressed under the existing Comprehensive Emergency Management Plan (CEMP). The adequacy of this document to deal with such incidents at closed waste sites will be addressed and, if necessary, the CEMP will be modified to adequately deal with such an incident. Second, the potential consequences of a slow degradation and eventual failure of a remedial system will be addressed in a separate plan (Contingency Plan). This plan will consist of a review of potential failure scenarios and will discuss measures to be taken to prevent this kind of failure, detect when such a failure does occur, and to repair or replace the degraded system to restore the remedial action to its original effectiveness. The periodic review and updating of these plans following their initial development are also included.

3.5 INFORMATION MANAGEMENT

An information management program is needed to ensure that the large quantity of information of various formats generated during the remedial actions and decontamination and decommissioning (D&D) programs is retained and made available to current and future site users, as needed. Various redundant systems will be used, including the retention of the Administrative Record, which is a complete history of all important elements of the project record (all engineering plans and reports, all correspondence with DOE and regulatory agencies, and any other pertinent information). A Historic Documents Library, which will be an easily accessible assembly of the most important project documents, such as work plans, final reports, and regulatory agency correspondence, will also be assembled. Portions of this library already exist. The existing documents will be assessed to ensure that all required documents are present and combined into a single document library. This element will also include the development of an Intrabased Web site so that this information will be readily available to on-site personnel; some portion of this information will also be made available to regulatory agencies and the general public.

3.6 INSTITUTIONAL CONTROLS

Institutional controls consist of various means of preventing inadvertent contact with contaminated media or damage to remedial systems by future users of the ANL-E site. These efforts include adequate consideration of the presence of former waste sites and contaminated media while planning for the future use of the ANL-E site; developing legally binding

restrictions on future land usage, should all or part of the ANL-E site be transferred to a different owner; and developing and implementing controls over the disposal of contaminated media present in the former waste sites or nuclear facilities should these be excavated, modified, or demolished in the future.

3.7 LTS PROGRAM DELIVERABLES

A number of routine reports will be generated by the LTS Program, as shown in Table 5. Most of these reports are required by the IEPA. One report, the Site Environmental Report (SER), is required by DOE but not the IEPA. It is a comprehensive report that discusses the entire environmental protection program at ANL-E, including activities related to LTS. The generation of this report is the responsibility of Environmental Monitoring and Surveillance (EMS), which carries out the Site-Wide Surveillance and Monitoring Program required by DOE Order 5400.1. Since this program is intended, in part, to monitor former waste sites, a fraction of the total cost of preparing the SER is included in this Baseline.

In addition to these routine reports, any upgrades or modification to existing remedial systems, or final closure activities, when they are planned and implemented, will result in the production of various work plans, demolition plans, construction reports, and other documents. Until such efforts are planned in detail, the specific deliverables cannot be identified.

4 COST BASELINE

The cost estimate used to develop the Cost Baseline is summarized in Table 6, as calculated in fiscal year (FY) 2002 (expressed in FY 2002 dollars). The detailed cost estimate is contained in Appendix B of this report. Table 7 contains a year-by-year spending plan for the program for the 5-year planning window. The spending plan was prepared by escalating the cost estimate values using an escalation rate of 3.5% per year. This Cost Baseline encompasses only the 5-year planning window.

The planning window activities include initial start-up activities, such as completing the Transition Plan and the LTS Program Plan; establishing an integrated database for monitoring data; preparing contingency plans, final closure plans, and other long-range plans; establishing the Administrative Record archive and information management system (document library and Web site); and establishing the necessary institutional controls for the LTS sites. Most of these activities are expected to occur in FY 2004 or FY 2005, providing sufficient funding is allocated. The Planning Window Cost Baseline also includes routine annual cost for each of the 5 years, assuming no change in the scope of the various programs during this period. It also includes conducting the second performance assessment in FY 2006 (5 years after the first, which was completed in FY 2001).

TABLE 5 Routine Deliverables Generated by the LTS Program

Deliverable	Frequency	Description
Quarterly Progress Report for 317/319 Area Remedial Actions	Quarterly	Describes operation and maintenance activities conducted during the previous calendar quarter for the 317 French Drain groundwater collection system, 319 Landfill and French Drain leachate collection and groundwater collection systems, 319 Landfill cap inspection and maintenance, 317/319 Area phytoremediation system, Off-Site Seep monitoring, and Groundwater Management Zone monitoring.
Quarterly Progress Report for the East-Northeast (ENE) Landfill	Quarterly	Describes inspection and maintenance activities performed during the previous calendar quarter at the ENE Landfill.
Quarterly Report for 800 Area Landfill Monitoring ^a	Quarterly	Transmits the results of the groundwater monitoring program for the 800 Area Landfill to the IEPA.
Annual Summary Report for 800 Area Landfill Monitoring ^a	Annual	Analyzes and discusses the results of the monitoring program for the 800 Area Landfill completed during the previous year.
Site Environmental Report ^b	Annual	Summarizes the results of the entire environmental protection program at ANL-E, including environmental monitoring at closed waste sites.

^a These reports are prepared to satisfy requirements in the 800 Area Landfill closure plan and operating permit.

^b This report will be generated by EMS as part of the Site-Wide Monitoring and Surveillance Program required by DOE Order 5400.1. It is not the direct responsibility of the LTS Program; however, since it contains information pertinent to the LTS Program, it is listed in this table.

The cost estimate for the LTS Program was developed from several sources, including actual costs incurred conducting similar work in recent years. The estimate was developed in a way that focused greatest attention on the activities expected to occur within the 5-year planning window. The approximate costs of activities expected beyond the planning window were estimated to provide an order-of-magnitude assessment of likely costs; however, these estimates should be reviewed and updated as more information about these out-year activities is developed in coming years.

Specific assumptions that affect the cost estimate are discussed in the WBS Dictionary for each element. Some general assumptions for the Baseline as a whole are included below.

It should be noted at this point that the cost estimate and schedule shown in this document were developed for the LTS Pilot Study only. They have not been reviewed and validated by other cognizant ANL-E organizations. In several cases, information needed to develop accurate estimates was not available and assumptions were made to complete the pilot study. These costs estimates should be considered only approximations of the actual cost estimates that will be developed after the pilot study concludes.

TABLE 6 Summary of LTS Program Cost Estimate (FY 2002 dollars)^a

Function	One-Time Cost	Ongoing Annual Cost	Periodic Cost (5 years)	Future One-Time Cost
LTS Program Management				
Administrative	29,837	70,568		
Technical	84,434	82,304	55,472	
Stewardship Operations				
Engineered Barriers I&M		37,933		
Operational Remedies O&M		269,547		
Environmental Monitoring	310,447	641,759		
Former Nuclear Facilities S&M		980,749		
Contingency Planning	57,229		7,005	
Information Management	191,946	95,986		
Institutional Controls	28,458	2,368		
Final Closure				
Waste Site Closure				b
Former Nuclear Facilities Demolition				b
Subtotal	702,351	2,181,214	62,476	727,123
Contingency (10%)	70,235	218,121	6,248	72,712
Total with Contingency	772,586	2,399,336	68,724	799,836

^a Abbreviations: I&M = inspection and maintenance; O&M = operation and maintenance; S&M = surveillance and maintenance.

^b Estimates for these two tasks are incomplete at this time. Additional information is needed before the estimates can be completed.

TABLE 7 Planning Window Cost Baseline (escalated dollars)^a

Function	One-Time FY 2004 Costs ^b	One-Time FY 2005 Costs ^b	Annual and Periodic Costs (escalated dollars) ^c				
			FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Tasks with One-Time and Annual Costs							
LTS Program Management							
Administrative Management	31,962		75,594	78,240	80,978	83,813	86,746
Technical Management	90,448		88,166	91,252	94,446	97,751	101,173
Stewardship Operations							
Engineered Barriers I&M			40,635	42,057	43,529	45,053	46,629
Operational Remedies O&M			288,745	298,851	309,311	320,137	331,341
Environmental Monitoring	332,558		687,469	711,530	736,434	762,209	788,886
Former Nuclear Facilities S&M			1,050,603	1,087,374	1,125,432	1,164,822	1,205,591
Contingency Planning	61,306						
Information Management	79,066	130,982	102,823	106,422	110,146	114,001	117,991
Institutional Controls	30,485		2,537	2,626	2,718	2,813	2,911
Periodic Tasks							
Performance Assessments and Plan Updates					63,655		
Contingency Plan Update ^d							
Final Closure							
Waste Site Closure	NA ^e						
Former Nuclear Facilities Demolition	NA						
FY 2004 and 2005 Subtotals	625,824	130,982	2,336,571	2,418,351			
Subtotal			2,962,395	2,549,333	2,566,648	2,590,598	2,681,269
Contingency (10%)			296,240	254,933	256,665	259,060	268,127
Total with Contingency			3,258,635	2,804,266	2,823,313	2,849,658	2,949,396

^a Abbreviations: I&M = inspection and maintenance; O&M = operation and maintenance; S&M = surveillance and maintenance.

^b This Cost Plan is based on an October 7, 2003, start date for the LTS Program. Depending on funding allocations in FY 2003 and the results of negotiations between EM and SC, this start date could be delayed one year or longer.

^c An escalation rate of 3.5% was assumed. Cost estimate was based on FY 2002 dollars.

^d There are no anticipated costs for this task within this planning window.

^e NA = not available; cost estimates for these two tasks were not available when this document was prepared.

Table 8 summarizes the partial long-range planning estimate based on an assumed program duration of 30 years (through FY 2033). Table 9 contains the planning level spending plan for the 30-year schedule. This 30-year period is arbitrary but is consistent with the Remedial Actions Project FY 1999 Baseline. Some elements of the LTS Program are expected to continue beyond 30 years; however, the scope of LTS activities after this point in time are not known, and there is little value in extending the planning process beyond the 30-year period. This planning long-range estimate is based on the long-range schedule discussed below. The costs for final closure activities were not included in the planning estimate because no plans or cost estimates for these activities were available at the time this document was prepared.

Many of the activities listed in this Baseline have been ongoing for several years. Historically, funding for these activities came from three sources: (1) the DOE EM Program (operation and maintenance and environmental monitoring at several remediation sites by the Environmental Remediation Program [ERP] within Plant Facilities and Services [PFS], and surveillance and maintenance of former nuclear facilities in the D&D Program); (2) general Laboratory overhead funds (Site-Wide Surveillance and Monitoring Program and surveillance and maintenance of several nuclear facilities where D&D is complete); and (3) Chemistry Division funds (part of the cost of the Building 200 Hot Cells surveillance and maintenance, with general Laboratory overhead paying for the remainder). After FY 2003, the EM funding will be reduced. The only direct EM funding anticipated after FY 2003 is approximately \$400,000 per year to support the surveillance and maintenance of the three D&D projects that were suspended in FY 2002. In addition, many one-time LTS Program start-up activities will be conducted in FY 2004, and some routine annual activities that had not been identified prior to the establishment of the LTS Program will begin. Starting in FY 2004, all other LTS Program activities are expected to be funded by SC through Laboratory overhead funds (with some funds for Building 200 Hot Cell surveillance and maintenance coming from the Chemistry Division). Table 10 gives the approximate distribution of historic funding and anticipated funding needs after FY 2004.

5 SCHEDULE BASELINE

The LTS Program schedule Baseline consists of only those activities that fall within the 5-year planning window. This schedule is shown in Figure 2. The schedule is based on an assumed start date of October 1, 2003. Whether or not the LTS Program actually begins on this date will depend on funding amounts allocated to ERP in FY 2003, as well as the result of expected negotiations between EM and SC regarding the transfer process. As this figure shows, three types of activities will occur in this time period: one-time, annual, and periodic. All but one of the one-time activities will be completed in FY 2004 (this assumes unlimited resources to complete these tasks). Developing the information management Web site will extend into FY 2005. One periodic task, the second performance assessment (the first was completed in FY 2001), will occur in FY 2006. The remaining activities are routine annual tasks related to Program Management, Stewardship Operations, and Information Management. This schedule assumes no major change in the LTS activities during the planning period.

**TABLE 8 Estimated Total 30-Year Long-Range Cost
(escalated dollars)**

Function	Estimated Total 30-Year Long-Range Cost ^a
Tasks with One-Time and Annual Costs	
LTS Program Management	
Administrative	4,327,771
Technical	5,106,000
Stewardship Operations	65,730,122
Contingency Planning	67,436
Information Management	6,064,961
Institutional Controls	177,594
Periodic Tasks	
Performance Assessments and Plan Updates	674,063
Contingency Plan Update	64,732
Final Closure	
	NA ^b
	74,738,799
Subtotal	
Contingency (10%)	7,473,880
Total with Contingency	82,212,679

^a An escalation rate of 3.5% was assumed.

^b NA = not available; no estimate for final closure activities was available when this document was prepared.

In addition to the Baseline Schedule, a Long-Range Planning Schedule was prepared and is shown in Figure 3. Since the LTS Program has no defined end point, an arbitrary period of 30 years was used to frame the planning schedule. In actuality, some LTS activities will be needed indefinitely; however, the scope and magnitude of these activities will decrease as remedial actions are completed and units closed, and D&D is completed and facilities demolished. The planning schedule attempts to depict some of this decreased scope and cost; however, the actual changes in LTS scope and cost will not be known for many years.

The following schedule assumptions were made during the development of this planning schedule:

- Phytoremediation will be complete 20 years after planting (FY 2019),
- The environmental monitoring program will be reduced by half by 2019,
- Surveillance and maintenance of former nuclear facilities will be complete and demolition will start in 2020,

TABLE 9 Partial 30-Year Long-Range Cost Plan (dollars)^a

Function	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tasks with One-Time and Annual Costs										
LTS Program Management										
Administrative	107,556	78,240	80,978	83,813	86,746	89,782	92,925	96,177	99,543	103,027
Technical	178,614	91,252	94,446	97,751	101,173	104,714	108,379	112,172	116,098	120,161
Stewardship Operations										
Engineered Barriers I&M	40,635	42,057	43,529	45,053	46,629	48,261	49,951	51,699	53,508	55,381
Operational Remedies O&M	288,745	298,851	309,311	320,137	331,341	342,938	354,941	367,364	380,222	393,530
Environmental Monitoring	1,020,027	711,530	736,434	762,209	788,886	816,497	845,075	874,652	905,265	936,949
Former Nuclear Facilities S&M	1,050,603	1,087,374	1,125,432	1,164,822	1,205,591	1,247,787	1,291,459	1,336,660	1,383,443	1,431,864
Contingency Planning	61,306	0	0	0	0	0	0	0	0	0
Information Management	181,888	106,422	110,146	114,001	117,991	122,121	126,395	130,819	135,398	140,137
Institutional Controls	33,022	2,626	2,718	2,813	2,911	3,013	3,119	3,228	3,341	3,458
Periodic Tasks										
Performance Assessments and Plan Updates			63,655					75,602		
Contingency Plan Update						8,102				
Final Closure (no cost included)										
Subtotal	2,962,395	2,549,333	2,566,648	2,590,598	2,681,269	2,783,216	2,872,243	3,048,373	3,076,818	3,184,507
Total with contingency	3,258,635	2,804,266	2,823,313	2,849,658	2,949,396	3,061,537	3,159,467	3,353,211	3,384,500	3,502,958

TABLE 9 (Cont.)

Function	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Tasks with One-Time and Annual Cost										
LTS Program Management										
Administrative	106,633	110,365	114,228	118,226	122,364	126,647	131,079	135,667	140,415	145,330
Technical	124,367	128,720	133,225	137,888	142,714	147,709	152,879	158,230	163,768	169,499
Stewardship Operations										
Engineered Barriers I&M	57,319	59,326	61,402	63,551	65,775	68,077	70,460	72,926	75,479	78,120
Operational Remedies O&M	407,303	421,559	436,313	451,584	467,390	483,749	211,048	218,435	226,080	137,473
Environmental Monitoring	969,742	1,003,683	1,038,812	1,075,171	1,112,802	1,151,750	596,031	616,892	638,483	660,830
Former Nuclear Facilities S&M	1,481,979	1,533,848	1,587,533	1,643,097	1,700,605	1,760,126	1,821,731	0	0	0
Contingency Planning	0	0	0	0	0	0	0	0	0	0
Information Management	145,042	150,118	155,372	160,810	166,439	172,264	178,293	184,533	190,992	197,677
Institutional Controls	3,579	3,704	3,834	3,968	4,107	4,250	4,399	4,553	4,712	4,877
Periodic Tasks										
Performance Assessments and Plan Updates			89,791					106,644		
Contingency Plan Update	9,622					11,428				
Final Closure (no cost included)										
Subtotal	3,305,587	3,411,323	3,620,511	3,654,295	3,782,195	3,926,000	3,165,920	1,497,880	1,439,929	1,393,807
Total with Contingency	3,636,146	3,752,456	3,982,562	4,019,724	4,160,415	4,318,601	3,482,512	1,647,668	1,583,922	1,533,188

TABLE 9 (Cont.)

Function	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Tasks with One-Time and Annual Cost										
LTS Program Management										
Administrative	150,417	155,681	161,130	166,769	172,606	178,648	184,900	191,372	198,070	205,002
Technical	175,432	181,572	187,927	194,505	201,312	208,358	215,651	223,198	231,010	239,096
Stewardship Operations										
Engineered Barriers I&M	80,855	83,685	86,614	89,645	92,783	96,030	99,391	102,870	106,470	110,197
Operational Remedies O&M	142,285	147,265	152,419	157,754	163,275	168,990	174,905	181,026	187,362	193,920
Environmental Monitoring	683,959	707,897	732,674	758,317	784,858	812,328	840,760	870,187	900,643	932,166
Former Nuclear Facilities S&M	0	0	0	0	0	0	0	0	0	0
Contingency Planning	0	0	0	0	0	0	0	0	0	0
Information Management	204,595	211,756	219,168	226,839	234,778	242,995	251,500	260,303	269,413	278,843
Institutional Controls	5,048	5,225	5,408	5,597	5,793	5,995	6,205	6,422	6,647	6,880
Periodic Tasks										
Performance Assessments and Plan Updates			126,660					150,432		
Contingency Plan Update	13,573					16,121				
Final Closure (no cost included)										
Subtotal	1,456,164	1,493,081	1,671,999	1,599,426	1,655,406	1,729,466	1,773,312	1,985,810	1,899,616	1,966,103
Total with Contingency	1,601,780	1,642,389	1,839,198	1,759,368	1,820,946	1,902,412	1,950,643	2,184,391	2,089,578	2,162,713

^a Abbreviations: I&M = inspection and maintenance; O&M = operation and maintenance; and S&M = surveillance and maintenance.

TABLE 10 Funding Sources for LTS Activities

Function	Historic Funding Source		Anticipated Funding Source after FY 2004		
	EM Funding Annual (%)	Laboratory Overhead Annual (%)	EM Funding Annual (%)	Laboratory Overhead Annual (%)	Laboratory Overhead One-Time Funds (%)
Administrative Management	NA ^a	NA	0	100	100
Technical Management	NA	NA	0	100	100
Stewardship Operations					
Engineered barriers Inspection and Maintenance	100	0	0	100	_b
Operational remedies Operation and Maintenance	100	0	0	100	-
Environmental Monitoring	18	82	0	100	100
Former Nuclear Facilities Surveillance and Maintenance ^c	37	63	37	63	-
Contingency Planning	NA	NA	0	-	100
Information Management	NA	NA	0	100	100
Institutional Controls	NA	NA	0	100	100
Final Closure	NA	NA	-	-	100

^a These activities are elements of the LTS Program that were not directly funded historically. However, some of these functions have been performed by the EM-funded corrective action program.

^b EM funding for surveillance and maintenance of three suspended D&D facilities will continue until the D&D is complete. All other EM funding will be terminated at the end of FY 2003.

^c A hyphen indicates that there is no anticipated cost for these activities that falls within the listed category.

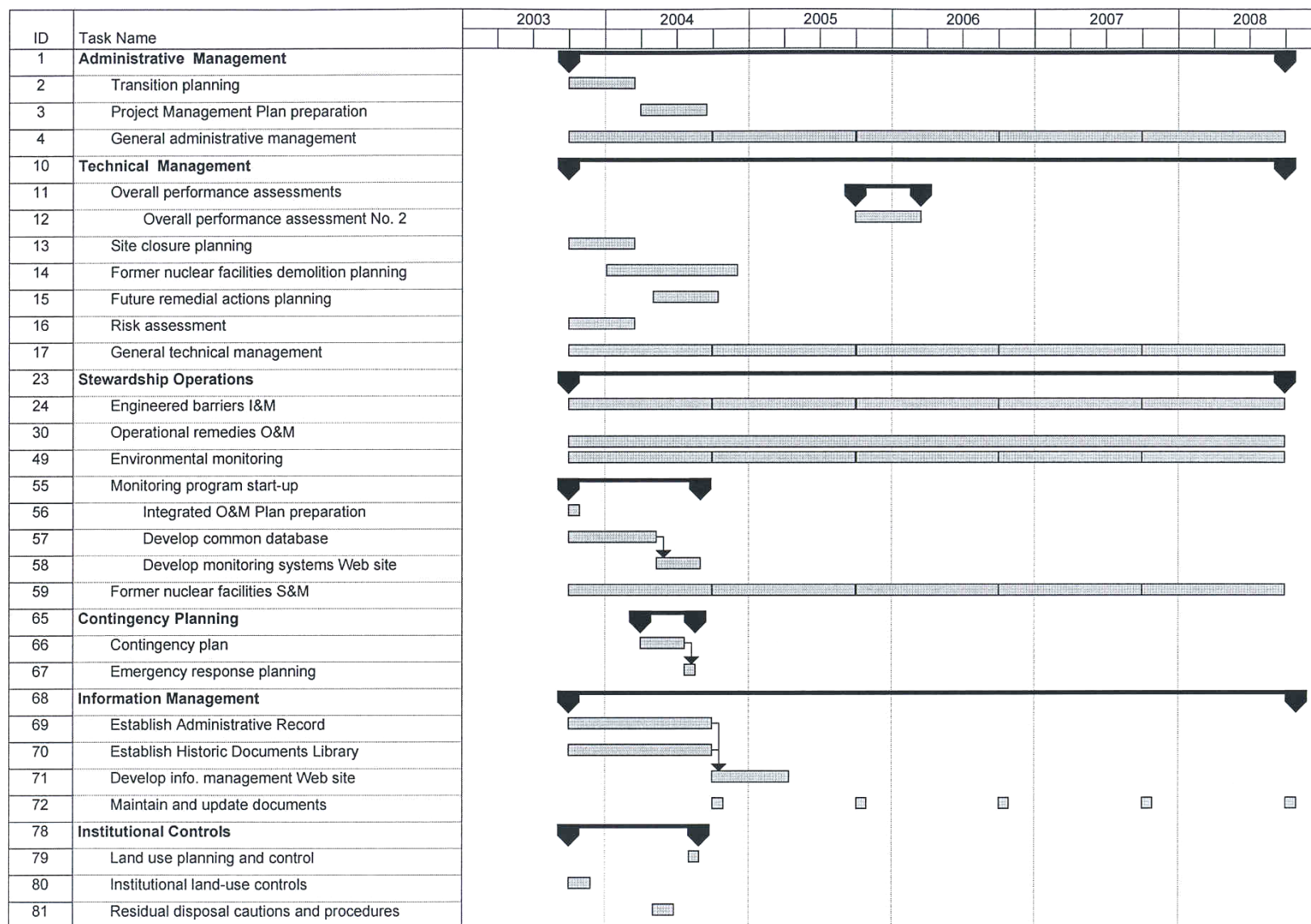


FIGURE 2 Planning Window Schedule

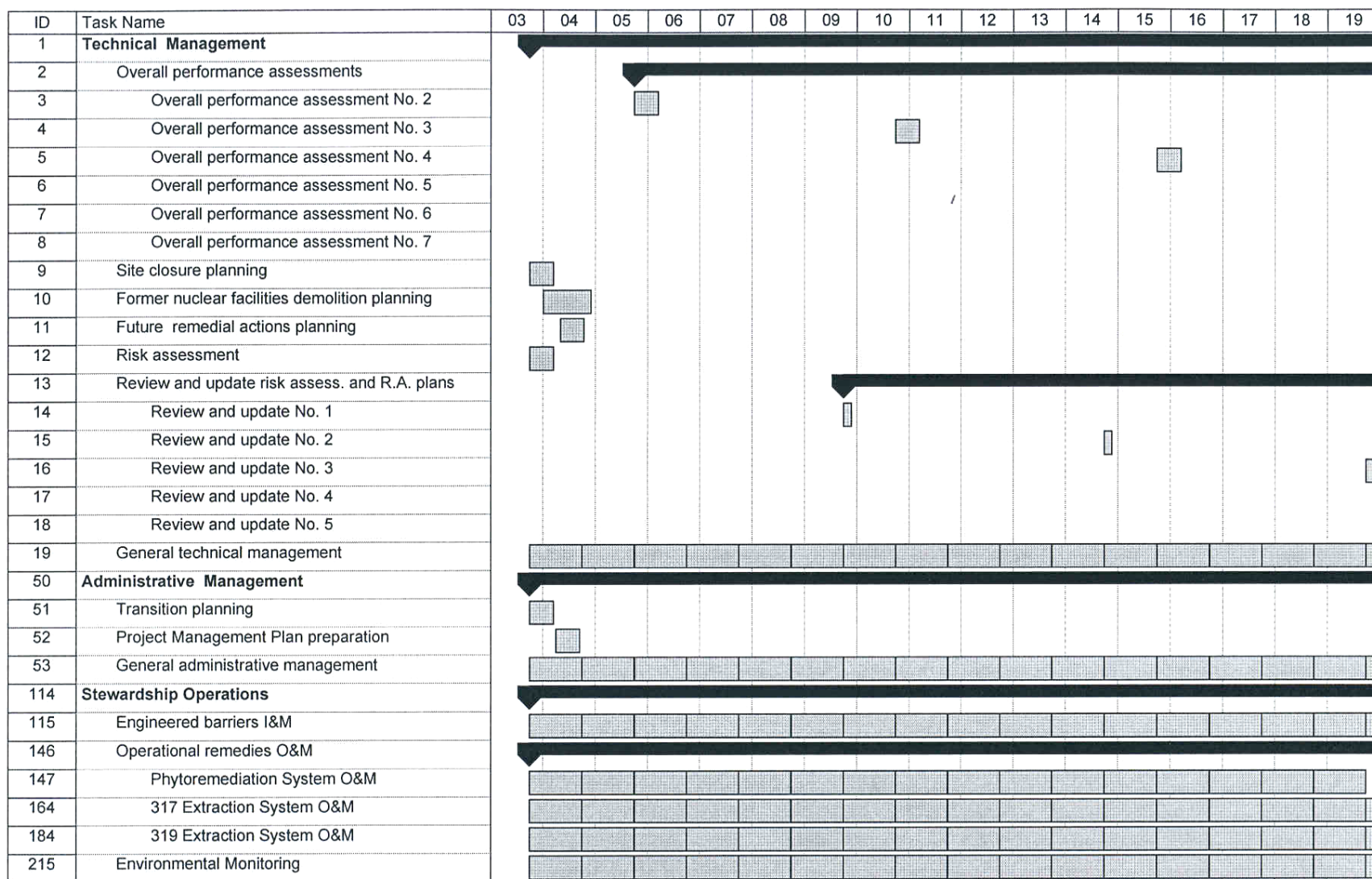


FIGURE 3 Long-Range Planning Schedule

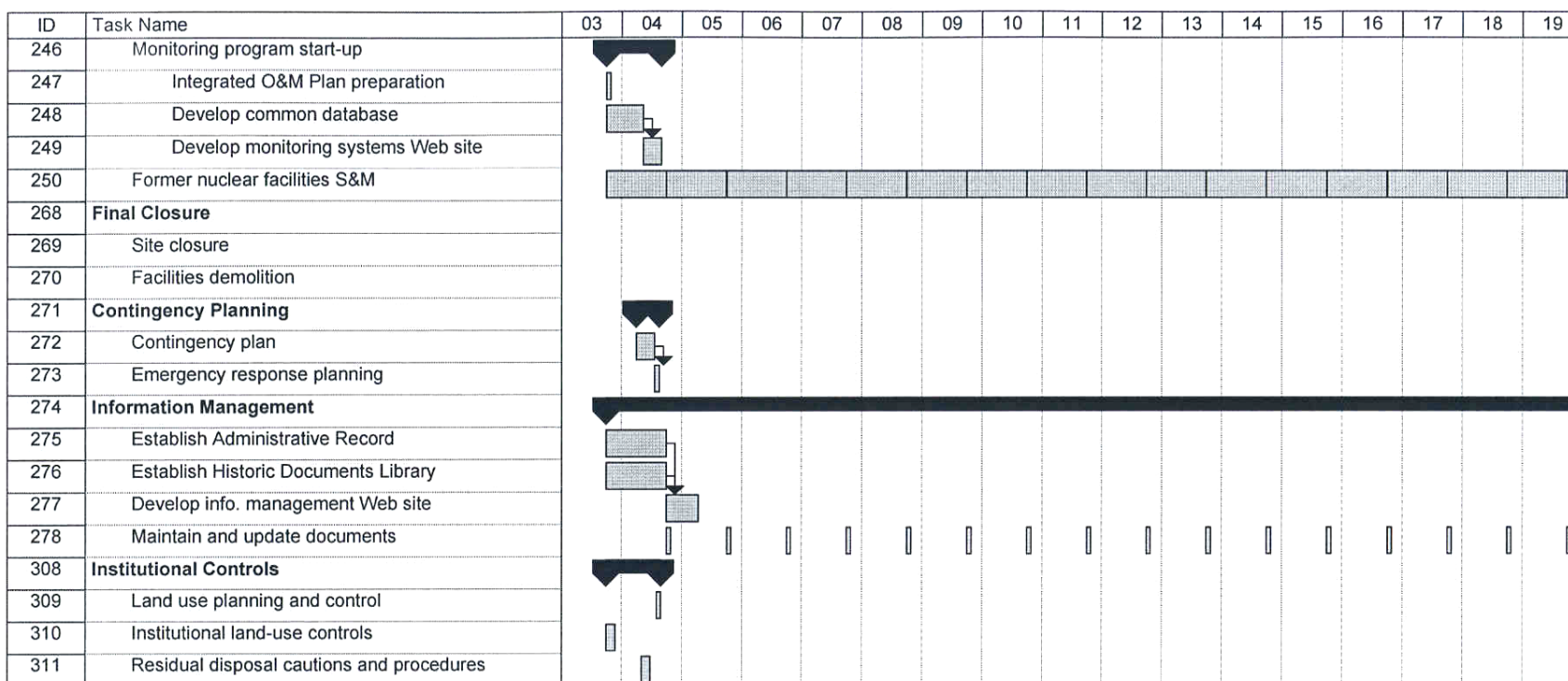


FIGURE 3 (Cont.)

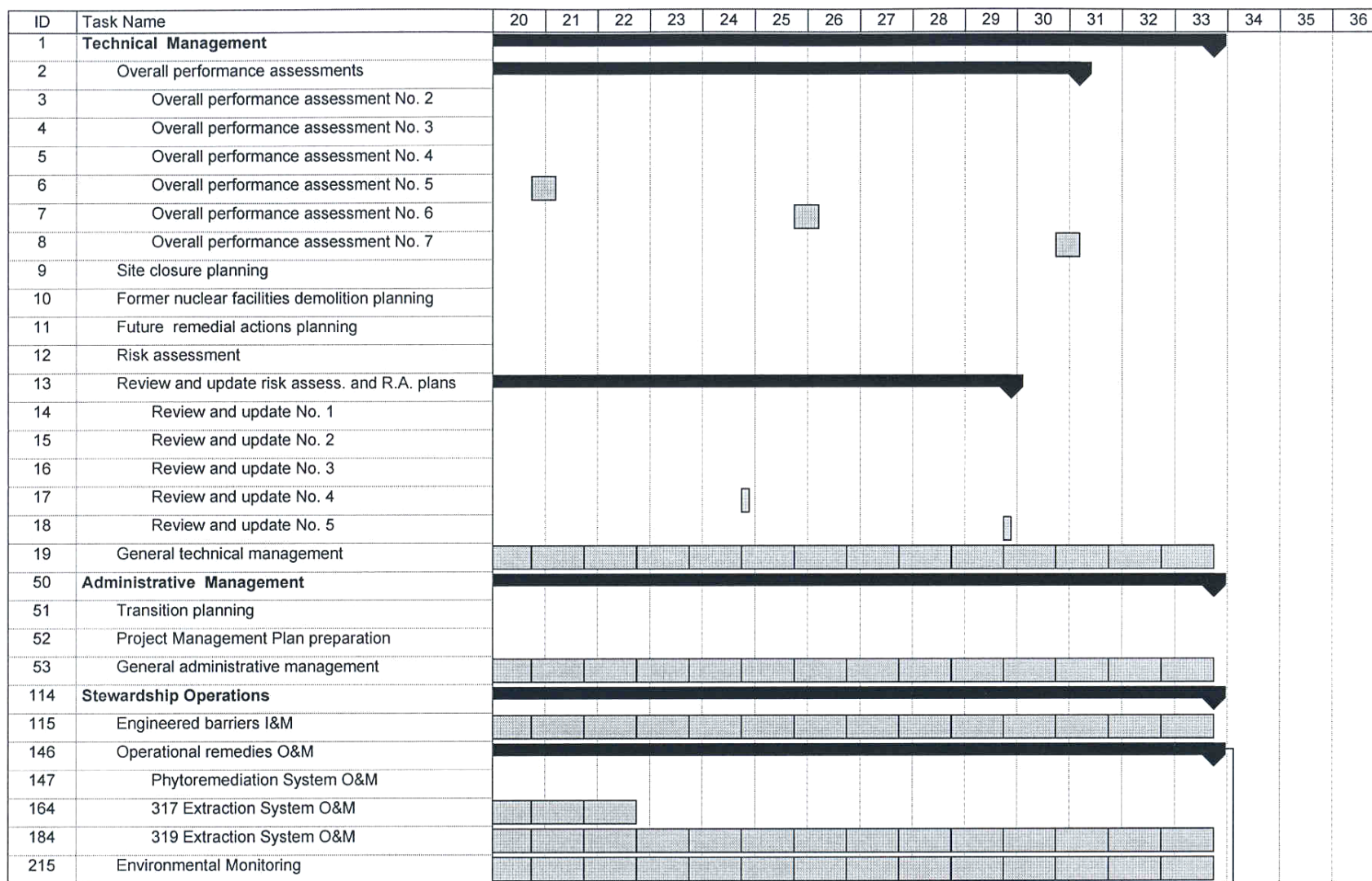


FIGURE 3 (Cont)

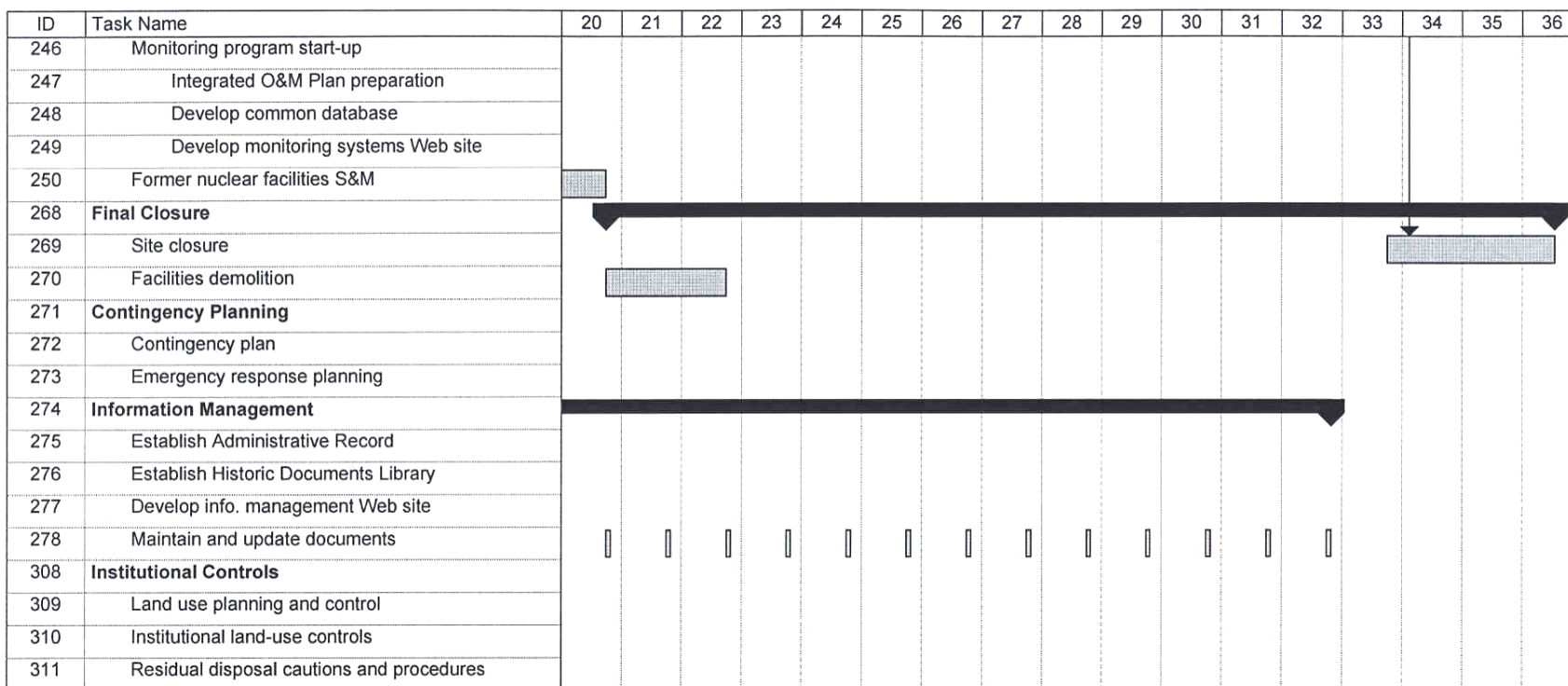


FIGURE 3 (Cont.)

- The 317 Groundwater Extraction system will be shut down in 2022, and
- The 319 Groundwater Extraction system will continue to operate past the 30-year period.

These scheduling assumptions are based on professional judgment derived from the current operating experience with operational remedies and other factors. The assumed date for terminating surveillance and maintenance is completely arbitrary since no plans have yet been made to complete the D&D of the three suspended projects or to demolish the two surplus former nuclear facilities (Bldg. 330 and Bldg. 301). Surveillance and maintenance must continue until the D&D and demolition are completed.

6 BASELINE IMPLEMENTATION

The activities described in this Baseline will be implemented by ANL-E under the existing operating contract with DOE. The work will be coordinated by an ANL-E LTS Program Manager who will have primary responsibility for identifying program needs, identifying means of meeting these needs, and tracking the effectiveness of the implementation. The various activities will be performed by several different ANL-E organizations, supplemented by contractors, as needed. A more detailed discussion of the LTS Program implementation strategy can be found in the Long-Term Stewardship Program Management Plan.

7 GENERAL ASSUMPTIONS

The information contained in this document was generated using the best available information and knowledge. Where there was not sufficient information, assumptions were made. Many of the specific assumptions are described in the WBS Dictionary (Appendix A). Several general assumptions that apply to various elements of the program are discussed below.

1. Regulatory agency requirements will not change significantly.
2. There will be no new discoveries of contaminated environmental media or structures beyond those that are discussed in this document. Such a discovery will necessitate a change to this Baseline.
3. The current remedial operations will continue to function as designed and effectively remove residual contamination at a rate that will achieve the final remedial objectives in accordance with the schedule assumptions discussed above.
4. The periodic performance reviews will not identify any significant modifications or repairs to the remedial actions beyond normal maintenance

- requirements. Should major improvements or modifications be required or desired, a change to the Baseline will be required.
5. Relationships with regulatory agencies, DOE, the general public, and other site stakeholders will continue to be positive.
 6. The current practices regarding operation and maintenance, performance monitoring, environmental monitoring, and surveillance and maintenance will continue unchanged. If the existing programs and practices are modified either by ANL-E or the IEPA, this Baseline will need to be changed to reflect cost or schedule impacts.
 7. The existing Monitoring and Surveillance Program will continue to sample and analyze environmental media as it currently does.
 8. The LTS Program will begin at the start of FY 2004.
 9. The LTS Program will be an integrated program, utilizing various organizations within the Laboratory to conduct most of the required work. Primary responsibility for planning and coordinating the various ongoing LTS activities will reside with the LTS Program Manager in EQO. Implementation will be delegated to other divisions already responsible for similar efforts across the ANL-E site.
 10. The ERP and D&D organizations will assist in the transition from active cleanup to stewardship but will not participate in the LTS Program itself. The ultimate fate of these organizations after FY 2003 is not known; it is assumed, however, that, except for assisting in the transition, they will not participate in the LTS Program. Should ERP be retained as a unit within PFS, it is likely that this unit would be responsible for many of the activities assigned to other PFS organizations in this document. However, it is unlikely that any of LTS responsibilities would be assigned to D&D, even if this organization was retained within the Technology Development Division (TD).

APPENDIX A:
WORK BREAKDOWN STRUCTURE DICTIONARY

WBS Index

ANL-E Project Title: Long-Term Stewardship Program (LTS) for ANL-E							
Line No.	WBS Elements						Title
	Indenture Level						
	1	2	3	4	5	6	
1	X						U.S. Department of Energy (DOE) Office of Science
2		X					DOE Office of Laboratory Operations and Environment, Safety and Health
3			X				Chicago Locations
4				X			Argonne National Laboratory-East
5					X		LTS Program Management
6						X	Administrative Management
7						X	Technical Management
8					X		Stewardship Operations
9						X	Engineered Barriers Inspection and Maintenance
10						X	Operational Remedies Operation and Maintenance
11						X	Environmental Monitoring
12						X	Former Nuclear Facilities Surveillance and Maintenance
13					X		Final Closure
14						X	Waste Site Closure
15						X	Former Nuclear Facilities Demolition
16					X		Contingency Planning
17					X		Information Management
18					X		Institutional Controls

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.1		5. WBS Element Title: LTS Program Management	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element is a summary level task that encompasses two subtasks: Administrative Management and Technical Management. All general Program Management functions are included in these tasks.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.1.1		5. WBS Element Title: Administrative Management	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes administrative efforts needed to organize, coordinate, and manage a variety of tasks included in the Long-Term Stewardship (LTS) Program. It includes the following subtasks.

- One-Time Tasks
 - Transition Plan preparation
 - LTS Plan preparation and maintenance
- Ongoing Activities
 - LTS Plan maintenance
 - Resource allocation
 - Interface with Argonne National Laboratory-East (ANL-E) and U.S. Department of Energy (DOE) management
 - Baseline management
 - Cost control
 - Overall schedule control

- Scope control (change control)
- Program Reporting

a. Cost Element

The cost associated with these tasks are of two types: (1) one-time costs incurred only once at the start of the program, and (2) annual costs that will recur each year at approximately the same amount. For both elements, the cost is composed entirely of ANL-E effort, primarily that of the LTS Program Manager.

b. Technical Content

The tasks included in this element are needed to support the effective and efficient establishment and ongoing operation of the LTS Program. The two one-time tasks represent the preparation of critical management tools needed to establish and maintain the LTS Program. The Transition Plan represents an agreement between the DOE Offices of Environmental Management (EM) and Science (SC) regarding the process of transferring the responsibility for funding, operation, and oversight of the LTS Program from EM to SC. The ANL-E LTS Program will generate this document on behalf of EM and SC; however, the agreement will be between EM and SC only and will not involve ANL-E. The LTS Plan describes the structure of the LTS Program at ANL-E and defines roles and responsibilities of the organizations within ANL-E that will participate in the program. It will also contain the Baseline for the LTS Program (scope, cost, and schedule). This document, once approved by ANL-E and DOE management, will be updated on a regular basis.

The ongoing tasks represent a collection of administrative activities that will be required each year during the life of the LTS Program. The functions include ensuring that adequate funds have been requested to maintain the program, tracking the use of those funds, and tracking the conduct of LTS activities on a day-to-day basis. It also includes the role as a central point of contact for information regarding the LTS Program. Regular reviews and updates to the LTS Plan are also part of this subelement.

c. Work Element

This task will primarily be implemented by the LTS Program Manager with assistance from other ANL-E personnel as needed.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.1.2		5. WBS Element Title: Technical Management	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes a group of tasks, primarily technical in nature, needed to properly manage the LTS Program. These tasks include monitoring the effectiveness of remedial actions, planning for future remedial actions, monitoring the risk of residual contamination, and keeping the regulatory agencies and other stakeholders informed about the progress of the remedial actions and engineered controls. It includes the following subtasks.

- One-Time Tasks
 - Site closure planning
 - Former nuclear facilities demolition planning
 - Future remedial action planning
 - Risk assessment for closed sites
- Periodic Tasks (approximately every 5 years)
 - Periodic performance assessments
 - Update of future remedial action plan
 - Update of risk assessment

- Ongoing Activities
 - Interaction with regulatory agencies
 - Environment, Safety and Health (ESH) oversight of LTS sites
 - Community involvement technical support
 - ANL-E strategic planning support

a. Cost Element

The costs associated with these tasks are of three types: (1) one-time costs incurred only once at the start of the program; (2) periodic costs that will recur on a regular basis greater than 1 year apart (typically 5 years apart); and (3) annual costs that will recur each year at approximately the same amount. For all three types of activities, the cost is composed primarily of ANL-E effort. The LTS Program Manager and personnel from several different ANL-E divisions will be utilized to conduct the one-time and periodic tasks. The ongoing tasks will involve primarily the LTS Program Manager.

b. Technical Content

The tasks included in this element are needed to provide adequate assessment of current LTS site conditions and associated risks and to adequately plan for future remedial actions.

Three one-time planning efforts (addressing site closure, former nuclear facilities demolition, and future remediation) deal with remedial efforts that will be required at some point in the future. The first plan deals with the final closure of the current operational remedies and engineered barriers. It will describe the steps necessary after the final remedial objectives have been met. Such steps include removal of monitoring wells, pumps, and air compressors, and phytoremediation trees. It will also include future one-time efforts needed to generate information necessary to request a NFA designation, such as performing a final confirmatory soil sampling program in the 317 Area French Drain.

The planning for demolition of former nuclear facilities will include plans and cost estimates for demolition, identification of the means of disposal of the demolition debris, and a plan for the future use of the site following demolition. Currently, this planning is limited to the Building 331 Chicago Pile-5 Reactor (CP-5) and Building 301, which have already been declared surplus property. In the future, additional buildings or facilities could be included in the plan; however, a BCP would be required to incorporate additional facilities.

The third plan will discuss the remediation of known or suspected environmental releases from historic or operating facilities. Such releases include the release of hydrogen-3 from the CP-5 reactor, the presence of radionuclides under the floor of Building 316 (identified during the

decontamination and decommissioning [D&D] of the Argonne Thermal Source Reactor [ATSR] Facility) and other similar situations. It will also discuss the need for investigations into suspected releases that were not addressed by the Environmental Restoration Project, such as the former off-site Underwriter's Pond, several former off-site burn pits, a number of small on-site units, such as a former shooting range and soil contamination under a several water towers. The identification of potential soil and groundwater contamination or activation associated with operational research or support facilities would also be addressed. Such structures include the Building 200 M-Wing Hot Cells and rod storage holes, the Intense Pulsed Neutron Source (IPNS) beam dump, Building 306 waste storage operations, and the wastewater treatment facilities. Funding for conducting these investigations and any required cleanup work would be pursued outside of the LTS Program at the appropriate time to implement the planned work. Periodically, this plan would be reevaluated to account for new information gained or changes in the status of operating facilities.

The above planning documents will be prepared with a view toward the length of time until the work will actually be started. If the work being considered will occur within the 5-year planning window for the LTS program, a detailed plan and bottoms-up cost estimate will be prepared. If the task is expected to begin beyond the planning window, less detailed plans and cost estimates will be prepared. When a distant future event eventually falls within the planning window, the work plans and cost estimates would be upgraded; the degree of detail would be increased to ensure that adequate funding is available when needed.

To support the prioritization of LTS activities and to accurately communicate the degree of residual hazard associated with the LTS sites, a risk assessment would be performed. This risk assessment would take several forms, depending on the nature of the site being investigated. A Site Conceptual Exposure Model (SCEM) would be prepared for those sites with residual contamination. For sites with significant completed pathways to potential human receptors, a numeric risk assessment would be prepared on the basis of conservative exposure assumptions. The periodic review and recalculation of risk (if needed) is included as one of the periodic tasks. An assessment of potential ecological risk would also be included. The degree of rigor used to develop these risk assessments would depend on the degree of real or perceived risk posed by the sites.

Periodic tasks include the review and update of the future remedial action plans as well as conducting a periodic performance assessment of the operational remedies and engineered barriers. The performance assessment would review the historic records related to inspections, maintenance, and monitoring of these systems and compare the results against the performance expectations for that unit. If deficiencies are found, a proposal for corrective actions would be prepared and a request for additional funds (if necessary) would be made. In addition, during each assessment, applicable new technologies, materials or techniques, which could improve the operation of the ongoing remedies or reduce the cost, would be identified and evaluated for possible implementation. If it is found that significant improvements in the operation of a remedy, which would reduce the potential risk of that unit, could be achieved by implementing a new technology, a proposal would be prepared. Depending on the nature of the proposed improvements, the cost may or may not be such that additional funds would be needed to implement the change. If additional funds are needed, a funding request would be prepared and

approval sought. Implementing the improved technology may or may not be within the capability of the LTS Program, depending on the magnitude of the effort. The correction of routine operational deficiencies is within the operations and maintenance scope of the LTS Program. Major changes to the remedial actions arising from the periodic assessment are outside the scope of the LTS Program. No cost is included in the LTS Program cost estimate for unanticipated major repairs or process changes.

In addition to the specific tasks addressed by this element, a collection of less-defined technical support functions is included under the term General LTS Technical Management Tasks. These tasks include overseeing the preparation of submittals to the regulatory agency (Quarterly Progress Reports, Quarterly and Annual Reports for the 800 Area Landfill, etc.); overseeing any ESH requirements that apply to the waste sites (erosion control, preparation of safety plans, digging permit restrictions, residual materials disposal, etc.); assisting the Office of Public Affairs (OPA) in its community outreach efforts regarding the ANL-E environmental protection program; responding to information requests from regulatory agencies, DOE, the general public, and other stakeholders; and assisting the Laboratory's strategic planning efforts.

c. Work Statement

This task will require the participation of a number of different ANL-E organizations, including Plant Facilities and Services/Facilities Engineering and Construction, and Environment, Safety and Health and Quality Assurance Oversight (PFS/FEC and EQO), and some of the research divisions. They will be managed by the LTS Program Manager. Implementation of major work tasks described in the various planning documents may or may not be the responsibility of the LTS Program, depending on the nature and magnitude of the actions. The responsibility for future tasks that are large enough to require new funding outside of the LTS Program will be assigned at the time the funding requests are prepared.

d. Assumptions

1. Periodic performance assessments will continue on a voluntary basis and will not be mandated by the IEPA.
2. The current ANL-E organizational structure will be modified to reassign responsibility for preparing submittals to regulatory agencies to the LTS Program from the Remedial Actions Program.
3. Risk assessments will be limited to SCEMs for all but the 317 French Drain and 319 Landfill. For these units, an abbreviated numeric risk assessment will be developed. Ecological risks will be described by simple narrative discussion of potential receptors and hazards. A numeric ecological risk assessment will not be prepared.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.2		5. WBS Element Title: Stewardship Operations	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This is a summary level task that includes the following work elements:

- Engineered Barriers Inspection and Maintenance,
- Operational Remedies Operation and Maintenance,
- Environmental Monitoring, and
- Former Nuclear Facilities Surveillance and Maintenance.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.2.1		5. WBS Element Title: Engineered Barrier Inspection and Maintenance	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the routine inspection and periodic maintenance of the three landfills located on ANL-E property: the 319 Landfill, the East-Northeast (ENE) Landfill, and the 800 Area Landfill. All monitoring of these units is included in the Environmental Monitoring element.

a. Cost Element

The costs associated with this task include ANL-E personnel labor costs for conducting the required inspections and completing the inspection logs. It also includes ANL-E effort and subcontract cost for routine repair of erosion damage; maintaining fences, signs, and access roads; and other routine maintenance costs. No cost is included for major repairs should such be needed as a result of catastrophic failure of the landfill caps (from floods, inadvertent excavation, or other major damage). All of the costs associated with this element are annual costs.

The preparation and maintenance of an up-to-date written plan for conducting inspection and maintenance activities is part of the scope of this task. However, all costs associated with preparing such a document are included in the Environmental Monitoring task, since this task also requires the preparation of such a document, and the monitoring activities will constitute the bulk of the document.

b. Technical Content

The tasks included in this element are needed to ensure that the three landfills are properly maintained, which will ensure that the waste is properly covered and that the infiltration of rainwater into the buried waste is minimized.

Landfill inspections are performed quarterly (though the ENE landfill inspection frequency will change to semiannual after 2006). Routine maintenance is performed on an as-needed basis. Past history indicates that erosion repairs are required every two to three years, though heavy rains could cause more frequent repair. The cost estimate assumes the need for erosion repair each year; therefore, there will be years when the demand for funding for maintenance is less than the budgeted amount.

c. Work Statement

This task will require the participation of one or more individuals from the LTS home organization to conduct the inspections and arrange for the maintenance work. Either a contractor will be hired to perform the work or the PFS Grounds organization will be used, depending on the size of the repair work and the availability of the Grounds personnel and equipment. Specialized training would need to be provided to Grounds personnel before they would be allowed to perform these functions.

d. Assumptions

1. The Suspect Landfill in the 800 Area will not require an engineered barrier of any kind and is therefore not included in this task.
2. Only minor routine erosion damage repairs will be included in the LTS budget. Repair of major damage or barrier failure will require a separate funding request.
3. The inspection and maintenance will be required for 15 years after IEPA approval of the closure actions. After this point in time, the inspection frequency will decrease to annually. The annual inspection and maintenance will be performed on a voluntary basis after the required 15-year period has expired. The cost for inspection and maintenance is assumed to remain constant even after the 15-year period expires.
4. The post-closure care period for the 800 Area Landfill had not yet officially begun when this document was written. The last required submittal (notification of filing the Plat of Survey with DuPage County) was completed in early 2002. It is possible that the IEPA will retroactively authorize the official start of the post-closure care period back to the early 1990s, when approval of the cap construction was granted. Until this issue is resolved, the length of the remaining post-closure care period will not be known.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.2.2		5. WBS Element Title: Operations and Maintenance Operational Remedies	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.:		11. Budget and Reporting No.:	
Title:			

12. Element Task Description

This element includes the routine operation and maintenance of the three operational remedies: the 319 Area groundwater and leachate collection system (including the subsurface barrier wall), the 317 Area groundwater extraction system, and the 317/319 Area phytoremediation system. These three units contain engineered systems consisting of mechanical equipment or engineered plantings that require regular attention by experienced personnel. The systems also require routine maintenance to keep them functioning as designed. To ensure the systems are working as planned, the operations and maintenance element includes performing certain monitoring activities, very similar to the Environmental Monitoring element.

a. Cost Element

The costs associated with this task include ANL-E personnel labor costs for performing the necessary operations oversight, performing or arranging for necessary maintenance activities, and conducting the required monitoring. It also includes subcontract costs for specialized equipment maintenance and analytical services to support performance monitoring activities. These tasks will ensure that the remedies will continue operating until the final remediation objectives are met and the IEPA authorizes the shutdown of these systems. The costs included are only normal routine maintenance and monitoring costs based on the current practices. No cost is included for major changes to the systems because of a process failure, changing site conditions, or for major repair or replacement of equipment or plantings due to catastrophic damage from storms, fires, lightning, floods, major animal damage, or insect or disease infestation of the phytoremediation trees. All of the costs associated with this element are annual costs.

The costs shown are based on a long-term average of maintenance requirements. The actual need for maintenance and repair funds will vary from year to year, depending on the useful life of the equipment and other factors. Therefore, the funds needed in a particular year may be less than or more than the average amount shown in the cost estimate.

The preparation and maintenance of an up-to-date written plan for operations, maintenance, and monitoring activities are included in the scope of this task. However, all costs associated with preparing such a document are included in the Environmental Monitoring task, since this task also requires the preparation of such a document, and environmental monitoring activities will constitute the bulk of the document.

b. Technical Content

The tasks included in this element are needed to ensure that the three operational systems are operated and properly maintained, and that their performance is monitored and assessed as required. This will ensure that the remedial actions will function as designed until the final remedial objectives are met and the systems can be shut down.

c. Work Statement

The specific tasks included in this element are shown below.

- 317 Groundwater Extraction System
 - Operational checks
 - Well condition inspection
 - Pump inspection and repair
 - Well cleaning
 - Compressor maintenance
 - Equipment replacement as needed
 - Monitoring system maintenance
 - Water level measurement
 - Groundwater sampling and analysis
 - Data review and report preparation

- 319 Groundwater Extraction System
 - Operational checks
 - Well condition inspection
 - Subsurface barrier wall area inspection
 - Pump inspection and repair
 - Well cleaning
 - Compressor maintenance
 - Equipment replacement as needed
 - Monitoring system maintenance
 - Water level measurement
 - Groundwater sampling and analysis
 - Data review and report preparation
- Phytoremediation
 - Growth and health monitoring
 - Annual tree damage repair or replacement
 - Ground cover mowing
 - Tree trimming
 - Roadway maintenance (317/319 Area)
 - Water level measurement
 - Groundwater sampling and analysis
 - Soil sampling
 - Tree and leaf sampling
 - Special studies (sap flow, continuous water level monitoring, etc.)

- Data review and report preparation
- Institutional controls maintenance
 - Fence maintenance
 - Sign maintenance

This task will require the participation of one or more individuals from the LTS Program, various PFS organizations (most likely Building Maintenance), and from the Environmental Monitoring and Surveillance (EMS) organization to oversee operations, ensure maintenance is performed, and perform the necessary monitoring, data review, and reporting. Either a contractor will be hired to perform the maintenance work or EMS personnel or other ANL-E support division personnel will perform the maintenance operations, depending on the nature and magnitude of the maintenance required.

d. Assumptions

1. Operations and maintenance requirements will not change significantly from current practices.
2. These systems will continue to function adequately, with only routine maintenance until the final remediation objectives are met.
3. Only routine maintenance activities to keep the existing system functioning as originally designed are included in this task. Process changes or major repairs are not included in this task.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.2.3		5. WBS Element Title: Environmental Monitoring	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the routine monitoring of corrective action sites where operational remedies that require performance monitoring are not present. These include the 800 Area Landfill, the off-site groundwater seeps, the 317/319 Area Groundwater Management Zone (GMZ), the CP-5 reactor, and monitoring and surveillance activities at the 317/319 Area and a number of isolated groundwater monitoring wells located around the site (this work is an element of the ongoing Site-Wide Surveillance and Monitoring Program).

a. Cost Element

The costs associated with this task include ANL-E personnel labor costs for collecting groundwater, surface water, and soil samples; reviewing the analytical data; and preparing reports for submittal to the IEPA (Quarterly Progress Reports, 800 Area Landfill quarterly and annual reports, and portions of the Site Environmental Report (SER), describing the sampling of the 800 Area Landfill, 317/319 Area EMS monitoring, the CP-5 reactor, and miscellaneous groundwater wells). This task also includes significant subcontract cost for analytical services to support the sampling activities. The costs are based on current monitoring practices and procedures. These tasks will provide information needed to determine if sites achieve or stay in compliance with regulatory requirements, or if changes in groundwater quality occur as a result of releases from the waste sites. All routine monitoring costs associated with this element are annual costs.

This task includes two one-time activities that are needed to support the long-term monitoring program. These include the preparation of an up-to-date written plan for operations, maintenance, and monitoring activities. This plan would be a single integrated plan that

addresses all operation and maintenance and monitoring requirements for all the former waste sites that have these requirements. The second task is the development of an integrated database that would contain all the monitoring results for both the Environmental Remediation Program (ERP) monitoring program and the EMS Site-Wide Monitoring and Surveillance Program. This subelement also includes the development of an Internet site to facilitate the review and use of the monitoring data.

b. Technical Content

The monitoring of these units is performed to satisfy regulatory requirements from several sources, including Operating Permit and Post-Closure Care Plan requirements for the 800 Area Landfill, Resource Conservation and Recovery Act (RCRA) Corrective Action monitoring requirements under the RCRA Part B Permit, and DOE Order requirements for site-wide environmental monitoring. The entire Site-Wide Monitoring and Surveillance Program is not included in this scope, only those elements that are performed at former waste sites, former nuclear facilities, or at key groundwater monitoring points.

c. Work Statement

The routine work scope described by this element consists of the collection and analysis of groundwater and surface water samples. The analytical data generated would then be incorporated into the new integrated database, and reviewed and discussed in applicable reports to the IEPA (Quarterly Progress Reports for Corrective Actions, quarterly data reports, and annual data summaries for the 800 Area Landfill submitted to the IEPA Solid Waste Section) and site stakeholders (portions of the SER that discuss former waste sites or nuclear facilities or other groundwater issues). The preparation of the reports required by the IEPA is included in the Technical Management element. This element only includes the generation of the required data. The cost of preparing the SER is part of the EMS program budget and is not included in the LTS Program cost estimate. This element includes only the cost of generating the data and entering the data into the database.

This task will require the oversight of the LTS Program Manager but will be primarily the responsibility of the EMS organization. Analytic services will be performed either by the in-house analytical laboratory or by an outside contractor. The cost estimate is based on a continuation of current practices, where samples from the Monitoring and Surveillance Program are analyzed primarily by the in-house analytical laboratory and the corrective action samples are analyzed by an outside commercial laboratory. The one-time tasks include the preparation of a detailed integrated Operation and Maintenance Plan that includes all corrective action units in the 317 and 319 Areas. The cost for a periodic review and update of this plan is also included. The remaining sampling is discussed in plans prepared by EMS.

The development of the integrated database will require several related activities. A new database will be established that will incorporate future monitoring data results using an automated data entry process that imports the raw data directly from electronic data deliverables

provided by the analytical laboratory. Historic data from both the Corrective Action Program and EMS will be converted to the new format and imported into the new database. A new sample numbering scheme, common to both Corrective Action sampling and EMS samples will be devised. Once the database is established, an Internet-based data management tool will be devised to facilitate the review of this data and the production of the necessary reports and other documents. Annual review and updating of the database and Web site is included in the estimate. Data management experts from Telecommunication Services (ECT) and research division personnel will be used to develop the integrated database and Web site. EMS will be responsible for maintaining the database and Web site.

d. Assumptions

1. The sampling and analysis responsibilities that now reside with ERP will be transferred to and integrated with the ongoing sampling and analysis responsibilities of EMS.
2. Sampling and analysis activities will continue as they are currently conducted through fiscal year (FY) 2019. After FY 2019, the cost of environmental monitoring is assumed to decrease by half as a result of the assumed completion of the phytoremediation system and attainment of remediation objectives at other units.
3. The current sampling in the ENE Area will demonstrate that groundwater is in compliance with groundwater quality standards after one year of sampling. By FY 2004, no environmental monitoring of this unit will be carried out.
4. The groundwater sampling currently being performed in the 800 Area Suspect Landfill will demonstrate that groundwater is in compliance with groundwater quality standards after one year of sampling, or alternate standards will be approved. By FY 2004, no environmental monitoring of this unit will be carried out.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.2.4		5. WBS Element Title: Former Nuclear Facilities Surveillance and Maintenance	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the routine inspection (surveillance) and maintenance of structures housing former nuclear facilities that have undergone partial removal of radioactive materials through the D&D process or are awaiting D&D. These sites currently include the Building 200 M-Wing Hot Cells (partial D&D); Building 330 CP-5 reactor (completed D&D with activation and hot spots remaining); Building 301 Hot Cells (partial D&D); Building 315 Zero Power Reactor (ZPR), Cell 6 (characterization completed); and Building 335 Juggernaut reactor (characterization complete). The environmental monitoring aspect of surveillance and maintenance of the Building 330 CP-5 reactor is included in the Environmental Monitoring task.

In addition to former nuclear facilities mentioned above, the ANL-E site contains other similar facilities, both active and inactive, which contain radioactive contamination. These units include several former D&D sites, such as the Building 211 Cyclotron and the Building 202 Janus Reactor, as well as various active hot cells and radioactive materials storage areas. The management of the contamination associated with these facilities is the responsibility of the programmatic division that owns the facility rather than the LTS Program. As a result, they are not discussed further in this document.

a. Cost Element

The costs associated with this task include ANL-E personnel labor costs for conducting routine walk-through inspections and testing of equipment and control systems and radiological surveys to confirm that contamination is not being released from these structures. It also includes the cost of routine maintenance to ensure that the building systems stay operational indefinitely

and the cost of utilities (electrical power, steam, etc.) to operate the facility. All routine costs associated with this element are identified as annual costs. It is assumed that all necessary planning for surveillance and maintenance activities has already been completed.

b. Technical Content

The surveillance and maintenance of these units are performed to satisfy ANL-E and DOE requirements regarding contamination control. These represent a set of similar activities at five former nuclear facilities. One facility, the Building 330 CP-5 reactor, has had D&D completed as much as possible without demolition of the structure. The Building 200 Hot Cell has had partial D&D completed, leaving portions contaminated but useable for future research purposes. The remaining three units — Building 301 Hot Cells; Building 315 ZPR, Cell 6; and Building 335 Juggernaut — were scheduled for complete D&D. The D&D process was started but work was suspended in FY 2002 before the D&D work could be completed. These three units will remain in the surveillance and maintenance mode until DOE authorizes funds to restart and complete the D&D work.

c. Work Statement

The surveillance and maintenance program involves many aspects of the facilities housing these units, including fire protection systems, emergency lighting and ventilation, pest control, structural integrity, roofing systems, drainage systems, vegetation control, custodial operations, heating and ventilation systems, and utility services. The surveillance inspections will identify any deficiencies, which will then be corrected by PFS. The routine preventative maintenance and correction of minor deficiencies will constitute the maintenance portion of this element. These tasks will ensure that radioactive contamination does not migrate from the structures and that personnel working within the structures will not encounter radioactive material and will be safe while working in and near them.

This task will be implemented by several organizations within PFS. The cost estimate is based on a continuation of current practices and assumes that no major faults occur in the facilities that require major repair or renovation.

d. Assumptions

1. Activities included in this element are limited to normal, routine maintenance and inspection functions. Repair of any major system failure or modification of existing systems is not included in this scope.
2. No additional releases or contaminated areas will be found that would change the nature or magnitude of surveillance and maintenance activities.

3. The existing building systems will continue to function adequately, with only normal routine maintenance, until either the structure is demolished or D&D activities are completed, thereby reducing contamination to "free release" levels.
4. Costs included are those provided by Technology Development Division (TD) personnel. An independent estimate was not performed.
5. Completion of the three suspended D&D projects and future D&D work will be performed by some organization outside of the LTS Program. The costs for completing the three suspended D&D projects or any new D&D work for currently operating facilities are not included in the LTS Program.
6. The scope of this element is limited to the five facilities mentioned above. Should any currently active nuclear facilities be shut down, resulting in the need for surveillance and maintenance by the LTS Program, a change to the Baseline will be needed.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.3		5. WBS Element Title: Final Closure	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element is a summary level task encompassing two subtasks: Waste Site Closure and Nuclear Facilities Demolition. These two subtasks include the implementation of the activities required to completely close remedial action sites and surplus former nuclear facilities.

Because planning for these elements has not yet begun, a cost estimate is not available. Thus, this version of the Baseline does not include any cost for this element. Subsequent revisions to the baseline will include the cost for this element.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.3.1		5. WBS Element Title: Waste Site Closure	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the implementation of the activities required at the completion of LTS activities to completely close a remedial action site, thus restoring the area to a natural environment or making it available for unrestricted future use.

a. Cost Element

The costs associated with this task include costs for the following final closure activities:

- 317/319 Phytoremediation system removal
 - Final soil verification sampling
 - Tree disposal sampling
 - Tree removal and replacement with native species (5-year process)
 - Monitoring well closure
 - Roadway removal
 - Fence removal

- 317 Extraction system removal
 - Well sealing
 - Vault removal
 - Piping removal
 - Compressor station demolition
 - Electrical power supply removal
 - Site restoration
- 319 Extraction system removal
 - Well sealing
 - Vault removal
 - Piping removal
 - Compressor station demolition
 - Cap reconstruction
 - Site restoration
- Site-Wide Closure
 - Closure of unused monitoring well (includes 60% of monitoring wells across the site)

The final closure of the remediation sites would occur after the final remediation objectives were met and the IEPA approved the termination of remedial action. When this will occur is not known. Closure of wells would likely occur in a phased manner. As remedial actions are complete for an individual site, the wells for that site would be closed. It is likely that some environmental monitoring would continue indefinitely and that a number of the existing wells would be needed indefinitely, even after all sites have met their remedial objectives.

One final closure task included under phytoremediation is the final verification sampling. This activity actually precedes the final closure but was included in this section since it is a part of the final closure effort. Once routine monitoring indicates that remediation objectives have been met, the full, final verification sampling called for in the IEPA approval letter for this action would be carried out. If all samples indicate that the objectives have indeed been met, the final

closure would proceed. If not, remediation would continue for some time and the sampling would be repeated.

b. Technical Content

The waste site closure activities will be very similar to remedial action activities and will require the assistance of well drilling contractors, excavation contractors, and construction/demolition contractors.

c. Work Statement

The work included in this task will involve significant planning, procurement, and project management effort as well as multiple contractors. The work will be managed by the LTS Program utilizing technical personnel in PFS and EMS, and contractors as necessary.

d. Assumptions

1. The final confirmatory sampling will verify that all remediation objectives have been met and that final closure activities for the phytoremediation system can commence. Sampling intervals will be based on current practices (one sample per 400 ft² plus one per 20 ft or perimeter length) and sampling of every depth interval (2-ft-long depth intervals).
2. The 319 Landfill leachate and groundwater collection system will continue to operate indefinitely, even after the 15-year post-closure care period expires.
3. Groundwater monitoring will be required after the landfill post-closure care period expires for at least another 15 years. Thus some of the monitoring wells will be needed for at least 30 years.
4. The costs for final closure are based on the remedial systems that are currently deployed. If the systems are modified or other remedial systems implemented, the cost of final closure will also change.
5. Environmental monitoring will be an ongoing need at the site in perpetuity; however, the magnitude of the program is expected to decrease as remedial actions are completed. It is expected that approximately 60% of the wells currently in place will eventually be closed. The remaining approximately 40% will remain open for periodic sampling.
6. The phytoremediation system will achieve its final objectives 20 years after planting (FY 2019).

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.3.2		5. WBS Element Title: Nuclear Facilities Demolition	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the implementation of the activities required to demolish surplus facilities containing former nuclear facilities and making the area that contains the facility available for unrestricted future use.

a. Cost Element

The costs associated with this task include costs for the following final closure activities.

- Building 330 CP-5 Reactor
 - Facility demolition
 - Off-site disposal of demolition debris
 - Final verification sampling
 - Site restoration
- Building 307 Hot Cells
 - Facility demolition
 - Off-site disposal of demolition debris

- Final verification sampling
- Site restoration

The demolition of Building 330 can proceed at any time, provided funds to pay for the work can be obtained and a means of disposing of the debris is identified. The demolition of Building 301 cannot proceed until the D&D work, started in FY 2001, is completed. A date for resumption of this work has not yet been identified.

b. Technical Content

The demolition of the former nuclear facilities will be quite complex and costly because of the nature of the facilities (highly reinforced reactor containment structure, hot cells, and related facilities) as well as the presence of low-level radioactive material contamination and the possibility of hidden contamination or contamination under the structures. This will require specialized contractors and careful planning and implementation. A major issue that has not yet been resolved is the disposition of the residual materials from the demolition of these structures. If shipped off-site for disposal, much of it would be considered radioactive waste, thus greatly increasing the cost. If buried on-site, continued monitoring of releases from the waste pile would be needed for many years after demolition. In this case, stewardship activities would not end but would change significantly from those needed to maintain a facility to those needed to monitor for an environmental release. Because such major issues have not yet been resolved, no cost estimate has been prepared.

c. Work Statement

The work included in this task will involve significant planning, procurement, and project management effort as well as multiple contractors. The role of the LTS Program in the demolition efforts will be to monitor the planning activities, the funding request process, and the eventual implementation of the demolition program itself. The actual planning and implementation would be conducted by one of the supporting organizations or a contractor.

d. Assumptions

1. Nuclear facilities demolition will completely remove contaminated materials from Building 301 so that no maintenance or monitoring of residual contamination will be needed.
2. Only Buildings 330 and 331 are included in the demolition task.
3. Only highly contaminated materials will be removed from Building 330 prior to demolition and in-place disposal of debris.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.4		5. WBS Element Title: Contingency Planning	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes the necessary planning to prepare for possible damage to and release of hazardous materials from the remedial action sites through catastrophic damage or long-term degradation.

a. Cost Element

The costs associated with this task include costs for ANL-E personnel to evaluate the potential for failure of the remedial system and prepare for the unlikely event that such failure would occur. Most of the costs are associated with the initial planning and are one-time costs. Some cost for a periodic review and update of the contingency plans is also included. Cost to respond to and repair a failure or degraded situation is not included in this task.

b. Technical Content

Contingency planning will address both emergency releases caused by possible catastrophic events and slow releases caused by major failures of the remedial systems. A significant hazard from a catastrophic event is considered highly unlikely since none of the waste sites contain materials that could be released in quantities large enough to cause injury, should the sites be damaged or destroyed in a highly unlikely natural or man-made event. The existing emergency response procedures contained in the Comprehensive Emergency Management Plan (CEMP) will be relied upon to handle any emergency situations related to these facilities. This document will be reviewed to ensure that the procedures are adequate for the LTS sites. If necessary, the CEMP will be revised to adequately address such situations.

To identify possible types of slowly developing failures that would require corrective actions, a failure analysis will be performed. Each remedial action with residual contamination will be examined to identify potential failure modes and the likelihood of each potential failure. The current inspection and maintenance procedures will be examined to identify ways of minimizing the likelihood of such failures and to detect when such a failure does occur. A series of failure response strategies will be prepared to address all reasonable failure scenarios. These procedures and strategies will be documented in a Contingency Plan that will be reviewed and updated periodically (approximately every 5 years).

c. Work Statement

Contingency planning will help ensure that residual contamination will not be released in quantities that could cause a hazard to on-site or off-site personnel or residents following either a catastrophic event or a slow degradation of the unit. This task will be implemented primarily by PFS Remedial Action Program Personnel (since they possess the necessary detailed knowledge of the remedial actions) supported by EQO and ANL-E Emergency Management Personnel. Once completed, the Contingency Plan would be reviewed and updated periodically by the LTS Program Manager.

d. Assumptions

1. The CEMP will be found to adequately address emergency situations involving the LTS sites, and only minor changes will be needed.
2. The potential failure scenarios will be limited to only a few (five or less for each type of unit), and the response plans will be simple and straightforward.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.5		5. WBS Element Title: Information Management	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

This element includes several tasks needed to properly manage the large amount of information generated by the Environmental Restoration Program, both the ERP and the D&D programs. It includes three subtasks.

- Administrative Record Management
- Historic Documents Library
- Information Access

a. Cost Element

The costs associated with this task include both one-time setup costs and ongoing annual maintenance costs. The costs are primarily for ANL-E personnel effort to develop and maintain the records repositories and make the information available to stakeholders.

b. Technical Content

Over the years of active environmental restoration work, large volumes of information were generated. Much of this information needs to be retained indefinitely. A subset of these documents may be of interest to future site users or other site stakeholders. The remainder of the information will have limited future use and can safely be archived. The retention, management, and accessibility of this information constitutes the scope of this element.

For each of the units, the most extensive set of project documents is the Administrative Record. This set of documents contains all important decision-making documents, such as work plans, characterization reports, final reports, independent verification survey reports, and similar documents. Key correspondence with regulatory agencies and internal correspondence related to significant project aspects is also included. The Administrative Record must be maintained indefinitely and updated in the future, where remedial actions will continue under the LTS Program. This set of documents is primarily retained for legal and program management purposes and will not be retained as a publicly available information resource. It will also serve as a backup information source for the Historic Documents Library.

The Historic Documents Library will be the primary information source available to on-site and off-site stakeholders. It will contain only critical decision documents, such as work plans, construction reports, characterization reports, and related approval letters from the IEPA and DOE. It will also contain copies of ongoing monitoring reports such as the Quarterly Progress Reports and 800 Area monitoring reports. This set of documents will exist in two forms: hard copy documents and electronic copies. Only the documents where there is expected to be a significant ongoing interest by on-site or off-site stakeholders will be converted to an electronic format. Hard copies of all the documents will be maintained by the Document Control Center operating out of Building 214. Both types of documents will be accessed through the information access system described below.

The Information Access element will consist of an Internet-based Web site that will describe the LTS Program and provide access to information about the program and about specific sites managed by the program. It will make large amounts of information about the LTS Program available, both historic information and recent monitoring information. It will be designed for access by the general public as well as by ANL-E and DOE personnel. The site will be updated on a regular basis by the LTS Program Manager and others. Information on the site will be made available either electronically, by downloading document files from the Historic Documents Library, or by providing a document title reference and location where a hard copy of the report can be located.

c. Work Statement

Information Management will involve all participants in the LTS Program as well as ERP and TD personnel. An important responsibility of these two programs during the transition from active remediation to LTS will be to transfer custody of all documents that should reside in the Administrative Record or the Historic Documents Library to the LTS Program. Other documents will be archived in retrievable records storage. These organizations will also generate a complete document list and identify which documents should be retained on-site and which should be made easily available, either electronically or via hard copy.

The development of the Administrative Record and Historic Documents Library will be completed with the support of records management professionals within ANL-E. The record and library will be structured and managed in a way that complies with DOE directives regarding records retention. Many elements of the Administrative Record and Historic Documents Library

for ERP are already in place. Most of the records for D&D have been archived with detailed logs of archived materials retained. Copies of key documents are located at several points across the Laboratory. The documents from ERP and D&D will be integrated into a single document library, and the entire existing set of records reviewed to ensure that all the necessary documents are present and entered into the documents database.

The Information Management Web site will be developed using public information and Web site development experts within the research divisions and other resources both inside and outside of ANL-E. The OPA will be involved in developing the elements of the Web site that are accessible to the general public.

d. Assumptions

1. Less than 20% of the historic documents will need to be converted to electronic form and made accessible through the Web site.
2. All project documents generated by D&D and ERP will be transferred to the LTS Program. A complete set of documents will be included.

WBS Dictionary, Element Definition

1. ANL-E Project Title: Long-Term Stewardship Program for ANL-E		2. Date : April 12, 2002	3. Identification No.:
4. WBS Element Code: 1.4.xx.1.1.6		5. WBS Element Title: Site-Wide Institutional Controls	
6. Index Line No.:	7. Revision No. and Authorization:		8. Date:
9. Approved Changes:			
10. System Design Description No.: Title:		11. Budget and Reporting No.:	

12. Element Task Description

Site-wide institutional controls are a set of activities needed to ensure that future users of the ANL-E site are knowledgeable about the presence of the former waste sites and take them into consideration while making plans for future site development. They also ensure that, should these sites be disturbed in the future, waste materials containing potentially contaminated media are handled properly.

a. Cost Element

The costs associated with this task include both one-time costs to assist DOE in developing and disseminating the required information, agreements, and controls, and ongoing annual costs to respond to information requests and participate in land use planning efforts. These costs are primarily for ANL-E personnel effort.

b. Technical Content

To ensure that future site users are aware of the presence of former waste sites and nuclear facilities with residual contamination, and to comply with IEPA requirements, a set of Institutional Controls are needed. These controls provide a means of preventing the inadvertent exposure of buried waste material or contaminated media, thus potentially exposing workers or the general public to these contaminants. The controls will identify what types of activities are not permissible in the vicinity of these waste sites (such as installation of water supply wells or the construction of residential dwellings) and provide a legally enforceable means of preventing such activities. They also ensure that residual materials removed from the area of former waste

sites will be handled and disposed of properly. These controls will be achieved in several ways, including assisting site land use planning entities by providing information about the LTS sites; assisting DOE in preparing binding legal agreements regarding land usage, such as Deed Restrictions and Memoranda of Agreements (MOAs) with effected government bodies (i.e., Forest Preserve District of DuPage County and the IEPA); preparing accurate geospatial information about the site locations and locations of residual contamination; participating in strategic planning efforts that involve disturbance of land that could contain a former waste site or facilities housing a former nuclear facility; participating in the National Environmental Policy Act (NEPA) review and “digging permit” review process where construction near a former waste site is anticipated; and providing guidance to project personnel who may be removing material from a former waste site or D&D site (e.g., earth excavation and disposal, and demolition or renovation of former nuclear facilities).

c. Work Statement

Institutional controls will require participation from several PFS organizations involved in land usage, including the Strategic Planning group, the FEC organization that reviews and issues digging permits, and Waste Management Operations, as well as the ANL-E and DOE legal departments. Geospatial information about the sites will be obtained and documented using professional surveyors and ANL-E geographical information system (GIS) experts. These efforts will be coordinated by the LTS Program Manager.

d. Assumptions

1. DOE will have primary responsibility for establishing legally binding external institutional controls (e.g., deed restrictions, MOAs). The LTS Program will participate in this process as requested by DOE.
2. ANL-E will have primary responsibility for long-range planning and residual management.
3. The ANL-E site will remain under the authority of the federal government for the life of the LTS Program.

APPENDIX B:
LONG-TERM STEWARDSHIP PROGRAM COST ESTIMATE

Summary of LTS Cost Estimate

Function	One time cost	Ongoing Annual Cost	Periodic Cost (5years)	Future One-time Costs
LTS Program Management - Administrative	\$29,837	\$70,568		
LTS Program Management - Technical	\$84,434	\$82,304	\$55,472	
Stewardship Operations				
Engineered barriers I&M		\$37,933		
Operational remedies O&M		\$269,547		
Environmental Monitoring	\$310,447	\$641,759		
Former nuclear facilities S&M		\$980,749		
Contingency planning	\$57,229		\$6,368	
Information Management	\$191,946	\$95,986		
Institutional Controls	\$28,458	\$2,368		
Final Closure				
Site Closure				NA (1)
Nuclear Facility Demolition				NA
TOTAL	\$702,351	\$2,181,214	\$61,840	\$0
Contingency (10%)	\$70,235	\$218,121	\$6,184	\$0
Total with contingency	\$772,586	\$2,399,336	\$68,023	\$0
NOTE: Costs in FY2002 dollars				
(1) Estimates for Final Closure activities were not available when this estimate was prepared				

Cost Estimate for LTS Administrative Management Activities

Task		Type (1)	One-time costs				Ongoing Annual Costs			
			Labor hours	Labor category	Labor Cost	M&S	Labor hours	Labor category	Labor Cost	M&S
LTS Program Management - Administrative										
	Transition Planning									
	Prepare draft Transition Plan	O	120	LTS	\$7,104					
	Incorporate review comments	O	32	LTS	\$1,894					
	Finalize transition plan	O	16	LTS	\$947					
	Project Management Plan Preperation	O								
	Prepare draft PMP	O	120	LTS	\$7,104					
	Cost estimate	O	120	LTS	\$7,104					
	Schedule	O	24	LTS	\$1,421					
	Incorporate review comments	O	32	LTS	\$1,894					
	Finalize PMP plan	O	40	LTS	\$2,368					
	Update PMP Plan	A					40	LTS	\$2,368	
	General Administrative Management (2)						500	LTS	\$29,600	
							1000	Clerical	\$38,600	
	Funding requests	A						Included above		
	Resource allocation	A						Included above		
	Interface with ANL-E and DOE management	A						Included above		
	Interface with other ANL-E site personnel	A						Included above		
	Baseline management	A						Included above		
	Cost control	A						Included above		
	Overall schedule control	A						Included above		
	Scope control (change control)	A						Included above		
	Program Reporting	A						Included above		
			Total One-time costs		\$29,837			\$70,568	Total Annual Costs	
			Contingency		\$2,984			\$7,057	Contingency	
	Total One-time costs with contingency				\$32,820			\$77,625	Total Annual Costs with Contingency	
(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years										
(2) Assumed to be 1/4 FTE										

Cost Estimate for LTS Technical Management

Task		One-time costs						Ongoing Annual Costs				
Technical Management		Type (1)	Labor hours	Labor category	Labor Cost	M&S	Descr.	labor hours	Labor category	Labor Cost	M&S	Descr.
Overall performance assessments												
	Review requirements	P (5 years)	16	LTS	\$947							
	Review Performance Data	P (5 years)	200	LTS	\$11,840							
			40	EAD	\$3,553							
			40	ES	\$3,885	1000	M&S					
	Prepare Assessment Report	P (5 years)	160	LTS	\$9,472	5000	editing					
	Develop proposals	P (5 years)	160	LTS	\$9,472							
Subtotal Perf. Review Periodic Cost						\$45,169						
Site closure planning												
	Review requirements	O	16	LTS	\$947							
	Prepare closure plans	O	16	LTS	\$947							
			120	ERP	\$7,913							
	Prepare closure cost estimates	O	16	ERP	\$1,055							
			40	ERP	\$2,638							
Former nuclear facility demolition planning												
	Review demolition strategy	O	8	LTS	\$474							
			16	PFS/FPE	\$1,302							
	Prepare demolition plan for CP-5	O	16	LTS	\$947							
			160	PFS/FPE	\$13,024							
			8	EEO	\$474							
	Prepare demolition plan for Bldg 301	O	16	LTS	\$947							
			160	PFS/FPE	\$13,024							
			8	EEO	\$474							
Future remedial actions planning												
	Prepare remedial action strategy plan	O	16	LTS	\$947							
			40	PFS/FPE	\$3,256							
			80	ERP	\$5,275							
	Review and update plan	P (5 years)	16	LTS	\$947							
			16	PFS/FPE	\$1,302							
Subtotal Periodic Cost						\$2,250						

Cost Estimate for LTS Technical Management

Task			One-time costs					Ongoing Annual Costs				
		Type (1)	Labor hours	Labor category	Labor Cost	M&S	Descr.	labor hours	Labor category	Labor Cost	M&S	Descr.
Technical Management												
	Risk assessment											
	Risk assessment for closed sites	O	40	LTS	\$2,368							
			320	EAD	\$28,422							
	Update risk assessment	P (5 years)	16	LTS	\$947							
			80	EAD	\$7,105							
	Subtotal Periodic Cost					\$8,053						
General LTS Technical Management (2)								500	LTS	\$29,600	2000	M&S
								1000	Clerical	\$38,600		
	Regulatory agency interactions										5000	Travel
	Transmit QPRs	A							Included above			
	Respond to inquiries	A							Included above			
	Regulatory Compliance Support	A						120	EEO	\$7,104		
	ESH oversight											
	Prepare (update) hazard assessment	A							Included above			
	Residual management support	A							Included above			
Community involvement (3)												
	CLRT Presentations	A							Included above			
	Respond to information requests	A							Included above			
	Land Use Planning Support								Included above			
									Included above			
			Total One-time costs		\$84,434							
			Contingency		\$8,443.40							
	Total One-time cost with contingency				\$92,877							
				Total Periodic Costs		\$55,472			\$82,304	Total Annual Costs		
				Contingency		\$5,547.15			\$8,230.40	Contingency		
			Total Periodic Costs with Contingency			\$61,019			\$90,534	Total Annual Cost with Contingency		
	(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years											
	(2) Assume 1/4 FTE											
	(3) Cost of OPA's involvement is not included in estimate											

Cost Estimate for Engineered Barrier Inspection and Maintenance Activities

Task			Type (1)	One-time costs				Ongoing Annual Costs		
Engineered barriers inspection and maintenance				Labor hours	Labor category	Labor Cost	M&S	labor hours	Labor category	Labor Cost
		O&M plans and procedures	O & P (5 years)	Included in O&M Plan						
		Landfill cap inspection and maintenance								
		800 Area Landfill Maintenance	A					\$14,858	See Work sheet	
		319 Area Landfill Maintenance	A					\$8,765	See Work sheet	
		ENE Area Landfill Maintenance	A					\$14,309	See Work sheet	
		Institutional Controls Maintenance								
		800 Area Landfill Maintenance								
		Road Maintenance	A					Included above		
		Fence maintenance	A					Included above		
		Sign maintenance	A					Included above		
		319 Area Landfill Maintenance								
		Road Maintenance	A					Included above		
		Fence maintenance	A					Included above		
		Sign maintenance	A					Included above		
		ENA Area Landfill Maintenance								
		Road Maintenance	A					Included above		
		Fence maintenance	A					Included above		
		Sign maintenance	A					Included above		
		Subtotal						\$37,933	Subtotal	
		Contingency						\$3,793	Contingency	
		Total						\$41,726	Total Annual Cost	

(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years

Cost Estimate Summary for Operations and Maintenance Activities

Task		Type (1)	Notes	One-time costs				Ongoing Annual Costs			
Operations and Maintenance of Operating systems				Labor hours	Labor category	Labor Cost	M&S	labor hours	Labor category	Labor Cost	M&S
Activity											
Function											
Operational remedies											
O&M plans and procedures		O & P (5 years)	Includes in O&M Plan								
Operations Oversight											
317 Groundwater Extraction											
	Operational checks	A							Included Below		
	Well condition inspection	A							Included Below		
319 Groundwater Extraction											
	Operational checks	A							Included Below		
	Well condition inspection	A							Included Below		
Phytoremediation											
	Growth and health monitoring	A							Included Below		
Maintenance											
317 Groundwater Extraction								\$34,023	See Work Sheet		
	Pump repair	A									
	Well cleaning	A									
	Compressor maintenance	A									
	Equipment replacement	A									
	Monitoring system maintenance	A									
319 Groundwater Extraction								\$19,853	See work sheet		
	Pump repair	A									
	Well cleaning	A									
	Compressor maintenance	A									
	Equipment replacement	A									
	Monitoring system maintenance	A									

Cost Estimate Summary for Operations and Maintenance Activities

Task		Type (1)	Notes	One-time costs				Ongoing Annual Costs			
Operations and Maintenance of Operating systems				Labor hours	Labor category	Labor Cost	M&S	labor hours	Labor category	Labor Cost	M&S
	Phytoremediation							\$30,851	See work sheet		
	Annual tree replacement	A									
	Groundcover mowing	A									
	Tree trimming	A									
	Performance monitoring										
	317 Groundwater Extraction	A						\$27,014	See work sheet		
	Water level measurement	A									
	Groundwater sampling and analysis	A									
	Data review	A									
	319 Groundwater Extraction							\$32,730	See work sheet		
	Water level measurement	A									
	Groundwater sampling and analysis	A									
	Data review	A									
	Phytoremediation							\$125,076	See work sheet		
	Water level measurement	A									
	Groundwater sampling and analysis	A									
	Soil sampling	A									
	Tree sampling	A									
	Data review	A									
	Institutional controls maintenance										
	Fence maintenance								Included above		
	Sign maintenance								Included above		
	Roadway maintenance (317/319 Area)	A									
	Subtotal							\$269,547			
	Contingency							\$26,955			
	Total							\$296,501			
(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years											

Cost Estimate Summary of Environmental Monitoring Activities

Task		Type (1)	One-time costs				Ongoing Annual Costs			
			Labor hours	Labor category	Labor Cost	M&S	labor hours	Labor category	Labor Cost	M&S
Envionrmental Monitoring										
	Monitoring plan and schedule (single integrated plan for all sites)		\$45,404	See Work sheet			\$5,079	See work sheet		
	Sampling and analysis									
	800 Area Landfill	A					\$316,998	See work sheet		
	Suspect Landfill	A					\$32,946	See work sheet		
	ENE Landfill (2)	A					\$0	See work sheet		
	Off-site Seeps	A					\$8,470	See work sheet		
	GMZ	A					\$20,786	See work sheet		
	CP-5	A					\$50,643	See work sheet		
	EMS monitoring 317/319	A					\$139,490	See work sheet		
	Site-wide groundwater	A					\$43,458	See work sheet		
	Monitoring results									
	Develop common database	O	\$184,964	See Worksheet						
	Review data	A					Included above			
	Data Q/A audit	A					Included above			
	Prepare common Web Site	O	\$80,079	See Worksheet						
	Enter data in Web site	A					Included above			
	Maintain Web site						\$23,890	See work sheet		
	Monitoring reports									
	Review data	A					Included above			
	Generate report	A					Included above			
	Tech editing	A					Included above			
	800 Quarterly rept.						Included above			
							Part of SER, not included in estimate			
	CP-5 Report									
	Total One-time costs		\$310,447				\$641,759	Total Annual Cost		
	Contingency		\$31,045				\$64,176	Contingency		
	Total One-time costs with contingency		\$341,491				\$705,935	Total Annual Cost with contingency		
	(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years									
	(2) According to work plan, ENE groundwater sampling will be conducted only for one year then will be stopped.									
	No monitoring scope is included in this estimate									

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
319 Landfill & 319 French drain						ERP water anal. rates	
	Interim action system monitoring						
	PM and ESH	-	Year long	-	-		
	Groundwater sampling	4	Quarterly	VOC, Tritium	319861A, 319871A, 319531, 319881	16	20
		4	Annual supplemental analysis	SVOC, PCB/pest., total metals, gross alpha, gross beta, Sr90, Pu238, Pu239, U234, U235, U238 (1)	319861A, 319871A, 319531, 319881	4	5
	Leachate sample	1	Quarterly	VOC, Tritium	EXT321	4	4
		1	Annual supplemental analysis	SVOC, PCB, Total Metals, gross alpha, gross beta, Sr90, Pu238, Pu239, U234, U235, U238	EXT321	1	1
	Surface water sample	1	Quarterly	VOC, Tritium	SW-1	4	4
		1	Annual supplemental analysis	SVOC, PCB, Total Metals, gross alpha, gross beta, Sr90, Pu238, Pu239, U234, U235, U238	SW-1	1	1
	Groundwater extraction wells	0	Annual	VOC, Tritium	EXT231, EXT241, EXT251, EXT261, EXT271, EXT281, EXT291, EXT301, EXT321	0	
	Review data		quarterly				
	Write up results		quarterly				
	Editing and final production		quarterly				
						Subtotal 319 L.F. monit.	
Cap O&M							
	Cap inspection		Year long		-		
	Cap maintenance		Year long		-		
						Subtotal 319 Cap I&M	
	Groundwater System Inspection						
	Groundwater system maintenance		Year long		-		
						Subtotal 319 Extr I&M	
800 Landfill & French drain I&M							
	PM and ESH		Year long	-	-		

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
	Cap inspection		Year long		-		
	Cap maintenance (erosion control)		Year long		-		
						Subtotal 800 I&M	
	800 Area Suspect Landfill groundwater monitoring						
	Groundwater sampling	9	Quarterly (4)	VOC, metals, gamma spec, tritium, gross alpha and beta, Pu isotopes, U isotopes		36	40
						Subtotal suspect landfill monitoring	
	317 Area French Drain, East Vaults Footing Drain, Vaults						
	PM and ESH	-	Year long	-	-		
	Phytoremediation system monitoring						
	Water level monitoring	30	quarterly	None	Assume 30		
	Groundwater sampling	21	Quarterly	VOC, Tritium	317151, 317181, 317231, 317232, 317321, 317322, 317331, 317332, 317341, 317342, 317351, 317361, 317381, 317391, 317461, 317462, 319171, 319291, 319301, 319401, 319411	84	92
	Air sampling for tritium	1	continuous	Tritium			
	Hydrogeological model analysis and update	1	At least annually	NA	NA		
	Soil sampling	5	Annual	VOC	NA		
	Plant growth and health monitoring	90	Three times during growing season				
	Plant transpire condensate sampling	5	Annual	Tritium	Five trees TBD		
	Plant leaves and stem sampling and analysis	10	Three times per year	VOCs and breakdown products,	NA		
	Review data	1	quarterly				
	Write up results	1	quarterly				
	Editing and final production	1	quarterly				
						Subtotal Phyto perf. monitoring	
	Phyto plantation maintenance	1	quarterly		-		
						Subtotal Phyto Maint.	

**Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities**

	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
Groundwater Extraction System							
	Groundwater sampling	10	Quarterly	VOC, Tritium	319601A, 317492, 317493, 317811, 317821, 317831, 317841, 317851, 317501, 319621	40	44
		3	Annual supplemental analysis	SVOC, metals, gross alpha, gross beta, gamma spec	317492, 317821, 317501	3	3
	Groundwater extraction wells sampling	13	Annual	VOC, Tritium	EXT011, EXT021, EXT031, EXT041, EXT051, EXT061, EXT071, EXT081, EXT091, EXT101, EXT111, EXT121, EXT131	13	15
	Data review and report preparation	-	Quarterly				
						Subtotal 317 Extr. Monit.	
	Groundwater system inspection	-	Year long		-		
	Groundwater system maintenance	-	Year long		-		
						Subtotal 317 Extr. O&M	
Off-Site Seeps							
	Seep Monitoring	3	Semiannual	VOC, Tritium	SP01, SP02, SP04	6	8
		3	Annual supplemental analysis	Total metals, gross alpha, gross beta, gamma spec	SP01, SP02, SP04	3	3
	Surface water monitoring	2	Semiannual	VOC, Tritium	SW01, SW02	4	4
		2	Annual supplemental analysis	Total metals, gross alpha, gross beta, gamma spec	SW01, SW03	2	2
	Data review and report preparation	-	Quarterly		-		
					Subtotal w/ 9% indirect 5% contingency Total		
						Subtotal seeps	
ENE Landfill							
Monitoring							
	Groundwater sampling	9	Quarterly (one year only)(2)	VOC, metals, gamma spec, tritium, gross alpha and beta, Pu isotopes, U isotopes	ENE011, ENE012, ENE013D, ENE021D, ENE031, ENE041, ENE051, ENE061, ENE071	0	0

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
	Data review and quarterly report preparation				None		
Cap O&M	Cap inspection				None		
	Cap maintenance				None		
						Subtotal ENE	
	Project Management and ESH oversight						
	Groundwater sampling	8	Semiannual analysis	VOC, tritium, SVOC, PCB/Pest.	317172, 317472, 319682, 319751, 319731, 317121D, 319131D, 319781, 319801	16	18
	Data review and report preparation	-	Quarterly		-		
						Subtotal GMZ	
Site-Wide Monitoring							
	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
							EMS Rates
	Program management and support						
						Subtotal Prog. Manag. and Support	
	Misc. Groundwater						
	Former water supply wells	3	Quarterly	VOC, gross alpha, gross beta, gamma spec, tritium, Sr-90	SW1, SW3, SW4	12	14
		3	Annual supplemental analysis	Ra-229, Ra-226, isotopic uranium	SW1, SW3, SW5	3	3
	Groundwater sampling	10	Quarterly	Tritium	FP8, FP17, DW6, HP9, HP10, HP11, ranger house	40	44
	Data management						
						Subtotal Site Groundwater	
317 Area Site-wide monitoring (SER)							

**Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities**

	Activity Type	Sampling points	Frequency	Analytes	Sampling Locations	Sampling events	Samples with >10% QA
	Groundwater sampling	10	Quarterly	VOC, SVOC, PCB/Pest, metals, gamma spec, tritium, Sr-90, chloride	317011, 317021, 319031, 319032, 317052, 317061, 317101, 317111, 317121D, 319131D	40	44
	Manhole sampling	2	monthly	VOC, tritium	MHE1, MHE2	24	27
	Seep Monitoring	3	Quarterly	VOC, tritium	SP01, SP02, SP04	12	16
	Data management		Quarterly				
						Subtotal 317 Area	
	CP-5 Groundwater monitoring						
	Groundwater sampling	4	Quarterly	Metals, VOCs, SVOCs, PCB/pest, tritium, gamma spec., Sr-90	330011, 330021, 330031, 330012D	16	20
	Data management		Quarterly				
						Subtotal CP-5	
	800 Area monitoring						
	Groundwater sampling	26 (two dry	Quarterly	VOC, Tritium, total metals, filtered metals, SVOC, PCB/Pest., TOC, TOX, inorganics (Cl, SO4, TDS, Cyanide, NH3, Phenols, FI,		104	115
	Data Management						
	Quarterly Report		Quarterly				
						Subtotal 800 Area	
		(1) 319 interim action work plan call for only gross alpha and beta and gamma spec in addition to VOC and tritium; however we have been analyzing also for SR-90, Pu isotopes and U isotopes. For this estimate we will use longer list.					
		(2) Only one year of groundwater sampling is proposed in work plans for the ENE landfill. IEPA has not yet approved this approach					
		(3) Unit rates for EMS analysis not provided, costs shown are assumed					

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	VOC	tritium	total metals	Filtered metals	SVOC	PCB/p est	Gross alpha/b eta	Sr-90	Uranium isotopes	Plutonium isotopes	Gamms spec.	inorganics	Total analytical cost
319 Landfill & 319 French drain		120	46	137	137	215	200	46	110	125	125	70		
	Interim action system monitoring													
	PM and ESH													
	Groundwater sampling	20	20											\$3,320
				5	5	5	5	5	5	5	5	5		\$5,825
	Leachate sample	4	4											\$664
				1	1	1	1	1	1	1	1	1		\$1,165
	Surface water sample	4	4											\$664
				1	1	1	1	1	1	1	1	1		\$1,165
	Groundwater extraction wells													\$0
	Review data													
	Write up results													
	Editing and final production													
														\$12,803
	Cap O&M													
	Cap inspection													
	Cap maintenance													
														\$0
	Groundwater System Inspection													
	Groundwater system maintenance													
														\$0
800 Landfill & French drain I&M														
	PM and ESH													

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	VOC	tritium	total metals	Filtered metals	SVOC	PCB/p est	Gross alpha/b eta	Sr-90	Uranium isotopes	Plutonium isotopes	Gamms spec.	inorganics	Total analytical cost
	Cap inspection													
	Cap maintenance (erosion control)													
														\$0
	800 Area Suspect Landfill groundwater monitoring													
	Groundwater sampling	40		40	40	40								\$24,360
														\$24,360
	317 Area French Drain, East Vaults Footing Drain, Vault													
	PM and ESH													
	Phytoremediation system monitoring													
	Water level monitoring													
	Groundwater sampling	92	92											\$15,272
	Air sampling for tritium													
	Hydrogeological model analysis and update													
	Soil sampling													\$23,768
	Plant growth and health monitoring													
	Plant transpire condensate sampling													
	Plant leaves and stem sampling and analysis													\$16,700
	Review data													
	Write up results													
	Editing and final production													
														\$55,740
	Phyto plantation maintenance													
														\$0

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	VOC	tritium	total metals	Filtered metals	SVOC	PCB/p est	Gross alpha/b eta	Sr-90	Uranium isotopes	Plutonium isotopes	Gamms spec.	inorganics	Total analytical cost
	Groundwater Extraction System													
	Groundwater sampling	44	44											\$7,304
				3	3	3		3				3		\$1,815
	Groundwater extraction wells sampling	15	15											\$2,490
	Data review and report preparation													
														\$11,609
	Groundwater system inspection													
	Groundwater system maintenance													
														\$0
	Off-Site Seeps													
	Seep Monitoring	8	8											\$1,328
				3	3			3				2		\$1,100
	Surface water monitoring	4	4											\$664
				2	2			2				2		\$780
	Data review and report preparation													
														\$212,897
														\$232,057
														\$11,603
														\$3,872
	ENE Landfill													
	Monitoring													
	Groundwater sampling													\$0

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	VOC	tritium	total metals	Filtered metals	SVOC	PCB/p est	Gross alpha/b eta	Sr-90	Uranium isotopes	Plutonium isotopes	Gamms spec.	inorganics	Total analytical cost
	Data review and quarterly report preparation													
Cap O&M	Cap inspection													
	Cap maintenance													
														\$0
	Project Management and ESH oversight													
	Groundwater sampling	18	18	18	18	18	9							\$13,590
	Data review and report preparation													\$13,590
Site-Wide Monitoring														
	Activity Type	VOC	tritium	total metals	Filtered metals	SVOC	PCB/p est	Gross alpha/b eta	Sr-90	Uranium isotopes (3)	Radon (3)	Gamms spec.	inorganics	Total analytical cost
		300	115	313	313	538	475		275	300	300	182	50	
Program management and support														
														\$0
Misc. Groundwater														
	Former water supply wells	14	14					14	14			14		\$12,208
										3	3			\$1,800
	Groundwater sampling		44											\$5,060
	Data management													
														\$19,068
317 Area Site-wide monitoring (SER)														

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

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Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling Labor hours	Other Labor	EQO Hours	TOTAL EAD HOURS	TOTAL ES HOURS	IPD costs	SUBCON. 1	SUBCON. 2	Total Cost
319 Landfill & 319 French drain										
	Interim action system monitoring									
	PM and ESH		80							
	Groundwater sampling	48								
	Leachate sample	12								
	Surface water sample	4								
	Groundwater extraction wells									
	Review data		8		12					
	Write up results		8							
	Editing and final production		4				8000			
		64	100	0	12	0	8000	0	0	\$32,730
Cap O&M										
	Cap inspection		16							
	Cap maintenance		40					5000		
		0	56	0	0	0	0	5000	0	\$8,765
	Groundwater System Inspection		16							
	Groundwater system maintenance		80					13000		
		0	96	0	0	0	0	13000	0	\$19,853
800 Landfill & French drain I&M										
	PM and ESH		16							

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling Labor hours	Other Labor	EQO Hours	TOTAL EAD HOURS	TOTAL ES HOURS	IPD costs	SUBCON. 1	SUBCON. 2	Total Cost
	Cap inspection		16							
	Cap maintenance (erosion control)		83	6			2073	5158		
		0	115	6			2073	5158	0	\$14,858
	800 Area Suspect Landfill groundwater monitoring									
	Groundwater sampling	108								
		108	0	0	0	0	0	0	0	\$32,946
	317 Area French Drain, East Vaults Footing Drain, Vault									
	PM and ESH		40							
	Phytoremediation system monitoring									
	Water level monitoring		16							
	Groundwater sampling	252								
	Air sampling for tritium		0							
	Hydrogeological model analysis and update				40					
	Soil sampling	See Work Sheet								
	Plant growth and health monitoring					68				
	Plant transpire condensate sampling					68				
	Plant leaves and stem sampling and analysis					200				
	Review data				8					
	Write up results		16							
	Editing and final production		4				8000			
		252	76	0	48	336	8000	0	0	\$125,076
	Phyto plantation maintenance		24					12000	15000	
		0	24	0	0	0	0	12000	15000	\$30,851

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling Labor hours	Other Labor	EQO Hours	TOTAL EAD HOURS	TOTAL ES HOURS	IPD costs	SUBCON. 1	SUBCON. 2	Total Cost
	Groundwater Extraction System									
	Groundwater sampling	120								
	Groundwater extraction wells sampling	39								
	Data review and report preparation		16				4000			
		159	16	0	0	0	4000	0	0	\$27,014
	Groundwater system inspection		32							
	Groundwater system maintenance		64					26000		
		0	96	0	0	0	0	26000	0	\$34,023
	Off-Site Seeps									
	Seep Monitoring	18								
	Surface water monitoring	12								
	Data review and report preparation		8				2000			
		30	8	0	0	0	2000	0	0	\$8,470
	ENE Landfill									
	Monitoring									
	Groundwater sampling									

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling Labor hours	Other Labor	EQO Hours	TOTAL EAD HOURS	TOTAL ES HOURS	IPD costs	SUBCON. 1	SUBCON. 2	Total Cost
	Data review and quarterly report preparation		8				1000			
Cap O&M	Cap inspection		16	16						
	Cap maintenance		32					8300		
		0	56	16	0	0	1000	8300	0	\$14,309
	Project Management and ESH oversight	16								
	Groundwater sampling	48								
	Data review and report preparation		16	4			1000			
		64	16	4	0	0	1000	0	0	\$20,786
Site-Wide Monitoring								ERP Grand total		\$369,682
	Activity Type	Sampling Labor hours	Other Labor	Total Cost						
	Program management and support		1000							
		0	\$59,200	\$59,200						
Misc. Groundwater										
	Former water supply wells	36								
	Groundwater sampling	120								
	Data management	256								
		24390.4		\$43,458						
317 Area Site-wide monitoring (SER)										

Cost Estimate Work Sheet for Current ERP and EMS
Environmental Monitoring and Operations and Maintenance Activities

	Activity Type	Sampling Labor hours	Other Labor	EQO Hours	TOTAL EAD HOURS	TOTAL ES HOURS	IPD costs	SUBCON. 1	SUBCON. 2	Total Cost
	Groundwater sampling	120								
	Manhole sampling	24								
	Seep Monitoring	48								
	Data management	192								
		22732.8		\$139,490						
	CP-5 Groundwater monitoring									
	Groundwater sampling	48								
	Data management	48								
		5683.2		\$50,643						
	800 Area monitoring									
	Groundwater sampling	312								
	Data Management	160								
	Quarterly Report	312								
		46412.8		\$316,998						
			EMS Total	\$609,789						
		2676								

Cost Estimate Work Sheet for Annual Soil Sampling in the Phytoremediation Area

Unit	Unit Name	Unit of Measure	Unit Price	Expected # of Samples	Expected Cost	Notes
19	Drill Exploratory Boring (0 to 50 feet)	Per VLF	\$15.00	300	\$4,500.00	10 borings, 30 ft deep each
20	Surcharge for Continuous sampling while drilling exploratory borings (0 to 50 feet)	Per VLF	\$7.50	300	\$2,250.00	
35	Mobilize drill rig to work site from off-site locations.	Per event	\$1,350.00	1	\$1,350.00	
38	Write, submit and revise a Job-Specific ESH Plan	Each	\$250.00	1	\$250.00	
39	Attend a scoping meeting	Each	\$300.00	1	\$300.00	
40	Attend a Pre-field work meeting	Each	\$300.00	1	\$300.00	
41	Staff Geologist II	Per hour	\$60.00	16	\$960.00	
	Total Drilling Subcontract				\$9,910.00	
	Indirect tax (9%)				\$891.90	
	Total				\$10,801.90	
Other costs						
	ANL Effort		59.2	80	4736	
	Analytica cost		120	44	5280	Four samples per boring, plus 4 QA samples
	Indirect tax on analytcial work (9%)				475.2	
	Misc				2000	
	Total				\$23,768.30	

Cost Estimate Work Sheet for Preparing Integrated Operation and Maintenance Plan for Remedial Action Sites

Task	Type	One-time costs					Ongoing Annual Costs				
		Labor hours	Labor category	Labor Cost	M&S	Description	labor hours	Labor category	Labor Cost	M&S	Description
Preparation of Integrated O&M Plan											
Compile requirements	O	24	ERP	\$1,583							
Prepare sampling plan and schedule	O	240	ERP	\$15,826	\$1,000	M&S					
		16	EAD	\$1,421							
Prepare Q/A plan	O	80	ERP	\$5,275							
Prepare O&M Plan	O	160	ERP	\$10,551							
Review	O	40	ERP	\$2,638							
Editing	O	16	ERP	\$1,055	\$5,000	Editing					
Transmittal letter	O	16	ERP	\$1,055							
Periodic review and update	P (5 years)						40	LTS	\$2,368	\$2,000	editing
							8	EAD	\$711		
Subtotal					\$45,404		Subtotal			\$5,079	

Cost Estimate Work Sheet for Developing a Monitoring Data Management Web Site

Activity	Type (1)	One-time set up costs					Ongoing annual maintenance costs				
		labor hours	Labor category	Labor Cost	M&S	Description	labor hours	Labor category	Labor Cost	M&S	Description
Conduct Web Site design process	O	160	EAD	\$14,211	5000	Software					
Develop draft web	O	40	LTS	\$2,368							
		400	EAD	\$35,527							
Finalize web	O	40	LTS	\$2,368							
		160	EAD	\$14,211							
		24	LTS	\$1,421							
Link common database to Web	O&A	16	EAD	\$1,421							
Link GIS to Web	O&A	24	EAD	\$2,132							
Link Web with LTS Web	O&A	16	EAD	\$1,421							
Maintain Web	A										
							96	EAD	\$8,526		
							96	LTS	\$5,683		
							96	ECT	\$7,680	2,000 usage fee	
Subtotal				\$80,079			Total Annual Cost		23,890		
(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years											
		\$89	hourly rate of EAD								
		\$59	hourly rate of LTS								
		\$80	hourly rate for ECT								

Cost Estimate Work Sheet for Developing an Integrated Monitoring Data Database

Activity	Hours	Cost	M&S	Other direct cost	
		\$89	hourly rate of EAD		
Develop uniform sample numbering scheme	80	\$7,105			
Develop location information for sampling locations	40	\$3,553		2000	Surveying cost
Complete ERP Database in Access	1000	\$88,817			
Convert EMS data to SQLServer format	240	\$21,316			
Build new scheduling and labeling software tool	320	\$28,422			
Build EDD data conversion modules					
ERP Monitoring Data	120	\$10,658			
EMS Data	120	\$10,658			
Build new SQLServer-based database	140	\$12,434			
Subtotal				\$184,964	

Cost Estimate Summary for Nuclear Facility Surveillance and Maintenance

Task		Type (1)	Notes	One-time costs				Ongoing Annual Costs			
				Labor hours	Labor category	Labor Cost	M&S	Labor hours	Labor category	Labor Cost	M&S
Former nuclear facilities surveillance and maintenance											
S&M plans and procedures											
Prepare S&M Plan		O & P (5 years)	Completed								
Prepare S&M Procedures		O & P (5 years)	Completed								
Facility surveillance & Maintenance											
Bldg. 200 M-Wing Hot Cells		A						\$522,000	See D&D Backup file		
Bldg. 330, CP-5		A						\$96,000	See D&D Backup file		
Bldg. 301 Hot Cells		A						\$167,412	See D&D Backup file		
Bldg. 315 ZPR 6		A						\$104,306	See D&D Backup file		
Bldg. 335 Juggernaut		A						\$91,031	See D&D Backup file		
Institutional controls maintenance								Included above			
Bldg. 200 M-Wing Hot Cells		A						Included above			
Bldg. 330, CP-5		A						Included above			
Bldg. 301 Hot Cells		A						Included above			
Bldg. 315 ZPR 6		A						Included above			
Bldg. 335 Juggernaut		A									
								\$980,749	Total (no contingency)		

(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years

Cost Estimate for Contingency Planning Efforts

Task		Type (1)	One-time costs					Periodic Costs				
			Labor hours	Labor category	Labor Cost	M&S	Descr.	Labor hours	Labor category	Labor Cost	M&S	Descr.
Contingency Planning												
Function												
	Emergency response planning											
	Review CEMP	O	16	LTS	\$947							
	Modify CEMP	O	16	LTS	\$947							
	Contingency planning											
	Perform Failure Analysis	O	16	LTS	\$947							
			160	EAD	\$14,211							
			40	ERP	\$2,638							
	Develop preventive strategies	O	24	LTS	\$1,421							
			80	ERP	\$5,275							
	Develop response strategies	O	40	LTS	\$2,368							
			40	ERP	\$2,638							
	Write Contingency Plan	O	80	LTS	\$4,736							
			320	ERP	\$21,102	\$4,000	editing					
	Review and update Contingency Plan	P (5 years)						40	LTS	2368	4000	editing
	Total One-time costs				\$57,229			Total periodic costs (5 years) FY2002 dollars			\$6,368	
	Contingency				\$5,723			Contingency			\$637	
Total One-time costs with contingency					\$62,952			Total periodic costs with contingency			\$7,005	
(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years												

Cost Estimate for LTS Information Management Functions

Task			Type (1)	One-time costs						
				labor hours	Labor category	Labor Cost	M&S	Description	Subcontract Amount	Subcontractor
Administrative Record Management										
		Complet Tabulation of ERP adminstrative record	O	40	ERP	\$2,638				
				24	Archivist	\$2,132				
		Tabulate D&D adminstrative record	O	8	TD	\$528				
				24	Archivist	\$2,132				
		Complete Compilation of ERP Administrative Record	O	40	ERP	\$2,638				
				80	Archivist	\$7,105				
		Compile D&D Administrative Record	O	40	TD	\$2,638				
				80	Archivist	\$7,105				
		Maintain and control Administrative Record	A							
Historic document Library										
		Identify records retention requirements	O	8	ERP	\$528				
				16	Archivist	\$1,421				
		Complete ERP document master list	O	16	ERP	\$1,055				
				40	Archivist	\$3,553				
		Develop D&D document master list	O	8	TD	\$528				
				32	Archivist	\$2,842				
		Complete ERP document hard copy library (two copies)	O	32	ERP	\$2,110				
				40	Archivist	\$3,553				
		Collect D&D Document hard copies (two copies)	O	8	TD	\$528				
				16	Archivist	\$1,421				
		Establish document library	O	16	ERP	\$1,055	1000	M&S		
				40	Archivist	\$3,553				
		Document Conversion	O	8	ERP	\$528			20000	Document scanning
				16	Archivist	\$1,421				
		Library maintenance and control	O&A							
Information access										
		LTS Information management Web Site								
		Develop LTS Info Web Site	O	\$118,138	See Work Sheet					
		Establish file management procedures	O		Included above					
		Generate links between Web site and GIS Map	O		Included above					
		Link Web site and historical records	O		Included above					
		Maintain Info Management Web Site	A							
		Link monitoring database to web site	O		Included above					
		Maintain Monitoring Web Site	A							

Cost Estimate for LTS Information Management Functions

Task			Type (1)	One-time costs							
Administrative Record Management				labor hours	Labor category	Labor Cost	M&S	Description	Subcontract Amount	Subcontractor	
		Progress reports									
		Link reports to Web site	A	Cost included in Web Site Maintenance							
		Monitoring data									
		Link database to Web site	A	Cost included in monitoring data management and Web Site maintenance							
		Total One-time costs		\$191,946							
		Contingency		\$19,195							
		Total One-time costs with contingency		\$211,141							
			(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years								
			(2) Storage fee is assumed annual charge for office space usage charges (VERIFY)								

Cost Estimate for LTS Information Management Functions

Task		Ongoing Annual Costs				
Administrative Record Management		labor hours	Labor category	Labor Cost	M&S	Description
	Complet Tabulation of ERP adminstrative record					
	Tabulate D&D adminstrative record					
	Complete Compilation of ERP Administrative Record					
	Compile D&D Administrative Record					
	Maintain and control Administrative Record	80	LTS	\$4,736	1000	M&S
		80	Archivist	\$7,105	5000	Storage fee (2)
Historic document Library						
	Identify records retention requirements					
	Complete ERP document master list					
	Develop D&D document master list					
	Complete ERP document hard copy library (two copies)					
	Collect D&D Document hard copies (two copies)					
	Establish document library					
	Document Conversion					
	Library maintenance and control	40	LTS	\$2,368	1000	M&S
		80	Archivist	\$7,105	5000	Storage fee (2)
Information access						
	LTS Information management Web Site					
	Develop LTS Info Web Site					
	Establish file management procedures					
	Generate links between Web site and GIS Map					
	Link Web site and historical records					
	Maintain Info Management Web Site	\$38,782	See Work Sheet			
	Link monitoring database to web site					
	Maintain Monitoring Web Site	\$23,890	See Work Sheet			

Cost Estimate for LTS Information Management Functions

Task			Ongoing Annual Costs			
Administrative Record Management			labor hours	Labor category	Labor Cost	M&S
		Progress reports				
		Link reports to Web site				
		Monitoring data				
		Link database to Web site				
		Total One-time costs				\$95,986
		Contingency				\$9,599
		Total One-time costs with contingency	Total Annual Costs, FY2002 dollars			\$105,585

Cost Estimate for LTS Web Site Production and Maintenance

Activity	Type (1)	One-time set up costs				Ongoing annual maintenance costs					
		labor hours	Labor category	Labor Cost	M&S	labor hours	Labor category	Labor Cost	M&S	Other direct cost	Description
Conduct Web Site design process	O	160	EAD	\$14,211							
Develop draft web	O	40	LTS	\$2,368							
		400	EAD	\$35,527							
Generate Web Content		40	LTS	\$2,368							
		400	LTS	\$23,680							
		240	ERP	\$15,826							
Finalize Web	O	40	EAD	\$3,553							
		160	EAD	\$14,211							
Link e-documents to Web	O&A	24	LTS	\$1,421							
		16	EAD	\$1,421							
Link GIS to Web	O&A	24	EAD	\$2,132							
Link Web with monitoring Web	O&A	16	EAD	\$1,421							
Maintain Web	A										
						96	EAD	\$8,526			
						288	LTS	\$17,050			
						96	ECT	\$7,680		2,000	usage fee
Subtotal				\$118,138				\$35,256	Total Annual Costs		
Contingency				\$11,814				\$3,526	Contingency		
Total with contingency				\$129,952				\$38,782	Total Annual		
(1) Task types are A = Annual routine task, O = One-time task to establish the LTS Program, and P = Periodic task repeated every 5 years											

Cost Estimate for LTS Site-Wide Institutional Controls

Activity		Type (1)	One-time costs				Ongoing Annual Costs			
			labor hours	Labor category	Labor Cost	Subcontr. Amount	Subcontr	labor hours	Labor category	Labor Cost
Institutional Controls										
Land use planning and control										
	Develop database for GIS system	O & A	40	LTS	\$3,200.00		16	LTS	\$947.20	
			16	EAD	\$1,421.08					
	Update Site GIS with LTS Site Info.	O & A	80	EAD	\$4,736.00		16	EAD	\$1,421.08	
	Participate in Strategic Planning	A	Included in LTS Admin/ Management							
	Respond to inquiries as needed	A	Included in LTS Admin/ Management							
Institutional land-use controls										
	Develop precise location information on units	O	32	LTS	\$1,894.40	\$5,000	surveyor			
			40	ES	\$3,885.46					
	Prepare Plat of Surveys	O	Done							
	Prepare deed restrictions	O	DOE Responsibility							
	Prepare MOA with Forest Preserve District	O	DOE Responsibility							
	Prepare Institutional control document for IEPA	O	40	ERP	\$2,637.69					
	Review and update institutional controls	P (5 years)	Cost included in LTS Tech. Management							
Residual disposal cautions and procedures										
	Include provisions in ESH Manual	O	32	LTS	\$1,894.40					
	Include provisions in digging permit process	O	16	LTS	\$947.20					
	Include provisions in WMO manual?	O	16	LTS	\$947.20					
	Include provisions in NEPA Process	O	32	LTS	\$1,894.40					
	Respond to inquiries as needed	A	Cost included in LTS Tech. Management							
									</	

Summary of Unit Labor Rates for ANL-E Personnel Used in Cost Estimate

ANL Division	Montly rate	hourly rate	Notes
LTS		\$59.20	LTS assumed to be same rate as EQO
PFS/ERP	\$11,430	\$65.94	
EQO		\$59.20	
EAD	\$15,395	\$88.82	
ES	\$16,837	\$97.14	
PFS		\$81.40	
ECT		\$80.00	Assumed
Clerical		\$38.60	Based on PFS Administ. rate

ARGONNE NATIONAL LABORATORY-EAST

**Conceptual Design for an Internet-Based Long-Term
Stewardship Management System for
Argonne National Laboratory-East**

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NOTATION

The following is a list of the acronyms and abbreviations used in this report. Acronyms and abbreviations used only in tables or figures are defined in the respective tables and figures.

ANL-E	Argonne National Laboratory-East
DOE	U. S. Department of Energy
EQO	Environment, Safety and Health/Quality Assurance Oversight (organization)
GIS	geographical information system
IEPA	Illinois Environmental Protection Agency
LTS	long-term stewardship
LTSMS	Long-Term Stewardship Management System
PFS	Plant Facilities and Services
UC	University of Chicago

CONCEPTUAL DESIGN FOR AN INTERNET-BASED LONG-TERM STEWARDSHIP MANAGEMENT SYSTEM FOR ARGONNE NATIONAL LABORATORY-EAST

1 INTRODUCTION

This document presents a conceptual design and design rationale for an Internet-based Long-Term Stewardship Management System (LTSMS) for Argonne National Laboratory-East (ANL-E). It is intended not only to assist ANL-E long-term stewardship (LTS) program managers in the development of an LTSMS for ANL-E, but also to provide other U.S. Department of Energy (DOE) LTS managers with useful input for design and development of LTSMSs for other DOE LTS sites. It contains the following elements: description of the design process, description of the needs assessment conducted as part of the design process, an annotated conceptual Web site architecture diagram; general recommendations for technical implementation of the LTSMS, an outline of a potential phased development approach, and selected examples of simulated Web pages from a hypothetical LTSMS Web site.

During the process of developing this conceptual design, consideration was given to the potential savings that could be gained through the development and use of a comprehensive information management system to support the LTS Program and other ongoing sitewide programs. These potential savings, or “mortgage reductions,” are discussed in Section 8 of this document.

2 BACKGROUND

The LTSMS will consist of an Intranet or Internet-based Web site and associated databases that contain much of the Web site content. The LTSMS will contain summary information on the former remediation sites and LTS Program elements. Additional detailed information will be made available through the extensive use of hyperlinks to project documents and other detailed information sources. The LTSMS site will serve as a focal point for accessing information about the LTS Program, descriptions of the individual sites and actions being taken, and monitoring data related to the LTS sites. It will also provide a central point where information regarding the nature of the LTS Program (e.g., work plans, schedules, and procedures) can be found. The funding and time allotted in the LTS Pilot Study did not allow for the development of the actual Web site or population of the site with project information. However, an extensive design development process, mediated by ANL-E Environmental Assessment personnel, was completed. The design concept is described in this document.

3 NEEDS ASSESSMENT

The needs assessment for the LTSMS utilized a structured methodology based on traditional product development practices adapted for specific application to Web site development. The process focused on defining a mission statement for the Web site; identifying key requirements and constraints for development of a successful Web site; and establishing a complete, prioritized delineation of Web site user groups and other stakeholders. A prioritized set of needs was formulated for each stakeholder group, and that list was used as the basis for developing the solution. Preliminary products of the design effort were a conceptual Web site architecture diagram and a general description of the site's contents, features, and services. Those products were used to compare alternatives (if any) and/or to make a "go/no go" decision on developing the Web site and guiding the actual development of the Web site if the solution was accepted.

Another product of the needs assessment was a design brief that documented the entire process and included the site architecture diagram and product description. For the ANL-E LTSMS, the design process was carried out to the point of developing a conceptual design brief, the content of which is described here.

Because LTS programs must be tailored to the needs of individual sites and organizations with different problems, needs, and resources, the elements of an LTS Program can vary considerably among sites. Thus, associated management tools like the LTSMS would also vary. Development of a management tool like LTSMS cannot be achieved successfully without considering the particular needs and resources of the site and organizations that would use the tool. The design brief presented here not only describes the major elements of the LTSMS, but also documents the stakeholders and needs this solution was intended to address, and the assumptions, requirements, and constraints that dictated its scope and functionality. The design brief thus provides a basis for developing an LTSMS tool tailored to other DOE sites and organizations with different needs and resources by comparison with the needs and constraints that guided the design process used here.

3.1 LTSMS DESIGN PARTICIPANTS

The primary source of information for development of the ANL-E LTSMS design brief was the ANL-E LTS Pilot Study Technical Lead, whose input was gathered during several structured design meetings typically used for the structured design methodology employed here. Input from the LTS Pilot Study Technical Lead was used to develop the proposed Web site design, which was subsequently reviewed by representatives of selected stakeholder groups, as well as ANL-E staff with expertise in LTS and related topics. The proposed solution was then modified to reflect the reviewers' input.

3.2 WEB SITE MISSION STATEMENT

The first step in the design process was to develop a mission statement for the Web site. The mission statement is a brief description of the general purpose of the Web site, the major stakeholders it is to serve, and a general idea of how it will achieve its purpose. The mission statement is important because the other steps in the design process (key requirements, key stakeholders, key constraints, needs identification) are defined and bounded the Web site mission statement.

The following mission statement was created for the ANL-E LTSMS:

Make information that describes the status and usability of former waste sites and decommissioned nuclear facilities readily available to current and future site custodians, managers, facility operators, and other stakeholders, while providing a description of stewardship requirements and other project management information to ANL-E LTS Program personnel and providing a set of information management tools to facilitate the implementation of the program.

3.3 WEB SITE KEY REQUIREMENTS

The second step in the design process was to develop key requirements for the Web site. This critical step defines what benefits the Web site must provide to fulfill the mission statement. The key requirements (bounded by specific constraints) determine the nature of the content and services to be provided on the Web site.

The key requirements for the ANL-E LTSMS are to provide:

1. Current and future stakeholders with up-to-date information about the nature and extent of residual contamination.
2. Information that describes the performance of ongoing remedial actions to on-site and off-site stakeholders to demonstrate compliance with Illinois Environmental Protection Agency (IEPA) and DOE regulations, and to monitor technical performance.
3. A repository for site-specific stewardship requirements.
4. A repository for historical information about sites.
5. A repository for general stewardship requirements.
6. A repository for LTS Program management information.

3.4 STAKEHOLDER IDENTIFICATION

The third step in the design process is to identify and prioritize stakeholders; that is, identify (1) *direct stakeholders*, or the actual users or audience for the Web site, and (2) *indirect stakeholders*, or those people or organizations that would not actually use the site but either would be affected by it or would affect it in some way. An indirect stakeholder can be anyone who controls resources (i.e., human, financial, or technical) used for development and maintenance of the site, anyone who influences the content of the site (e.g., DOE, regulatory agencies), or others who may benefit from or be harmed by the site.

Complete, prioritized stakeholder identification is crucial to successful design of a Web site because these sites are tools that must be designed for easy use by people with specific needs and behavior patterns. Typically, a Web site has multiple user groups, with many (and sometimes conflicting) needs. It is impossible to achieve optimal usability for all needs for all users. The designers must know for whom they are designing and which users are the most important. Normally, designers strive to achieve some level of usability for all users but must concentrate on making the site as usable as possible for the most important groups of users, which may involve “sacrificing” the needs and usability for less important user groups.

Indirect stakeholders are important because they may control critical resources or dictate certain approaches or content that can constrain the design solution.

For the ANL-E LTSMS, seven different groups were identified as likely users of the Web site, and four groups were identified as indirect stakeholders. In designing the site, primary consideration was given to the needs of the direct stakeholder groups. A prioritized list of direct (site users) and indirect stakeholders was developed for the ANL-E LTSMS and is described in the following sections.

3.4.1 Direct Stakeholders and Site Users

A prioritized list of direct stakeholders and site users identified for the ANL-E LTSMS Web site is given below:

1. Site-specific information users
 - Current and future land use managers and facility managers
 - Digging permit restrictors (Plant Facilities and Services [PFS])
 - National Environmental Policy Act owners
2. IEPA users who are looking for detailed compliance-related information. IEPA usage of the site might decrease over time as remedial activities for the various sites are completed.

3. Groups “inputting” data directly to the system, possibly through the Web site
 - Operations and Maintenance Personnel
 - Environmental Monitoring and Surveillance (monitoring and surveillance)
 - Environment, Safety and Health/Quality Assurance Oversight (EQO) (regulatory compliance)
 - ANL-E geographical information system (GIS) staff (ANL-E spatial data)
4. LTS Program Manager (probably one person but possibly others with similar needs)
5. ANL-E/University of Chicago (UC) (PFS, EQO, Chief Operating Officer, Legal, Director) and DOE Management (Environmental Management, Environment, Safety and Health, Office of Science)
6. Public interest groups and local government agencies that may be affected by land use restriction issues (e.g., zoning)
7. General public

3.4.2 Indirect Stakeholders

A prioritized list of indirect stakeholders identified for the ANL-E LTSMS Web site is given below:

1. Web site development and maintenance organization (cost and ease of design and maintenance)
2. ANL-E and other organizations that contribute documents and data (compatibility issues) but do not enter information directly into the LTSMS
3. “Keepers” of related data or databases at ANL-E (compatibility issues)
4. ANL-E Office of Public Affairs (for public information)

In designing the site, the primary goal was to meet the needs of, and optimize the usability for, those users at the top of the prioritized stakeholder list, with the other user groups’ needs subordinated accordingly. Indirect stakeholder concerns, while not addressed specifically in the actual Web site design, were considered throughout the design process.

3.5 KEY CONSTRAINTS

Key constraint analysis identifies factors that constrain the solution set, such as budget, schedule, resource availability, technology, etc. Key constraints might also include assumptions about audience education, experience, browsers, security, etc.

Key constraints strongly influence decisions about project scope, both in terms of content and services, and decisions about technological approaches for site development.

For the ANL-E LTSMS, detailed information about constraints was not available, so assumptions were made that the LTS Pilot Study Technical Lead thought would approximate the likely development scenario. Those assumptions are as follows:

1. Plan for the system to reside at ANL-E.
2. Assume \$100,000 initial development cost, with additional incremental funding to expand/enhance site in a phased development approach.
3. Assume \$100,000 to \$50,000/year for maintenance, including data input.

3.6 PRIORITIZED NEEDS

The identification of prioritized needs for each site user group is an important step in determining specific features and services to provide on the Web site and in establishing an architectural hierarchy for the site. It serves as the basis for development of the conceptual site architecture diagram. In general, the designed Web site should provide easiest access to those features and services that are the highest priorities for the most important user groups, while accommodating the needs of multiple user groups where possible.

More than 75 user needs were identified for the 7 site user groups defined in the stakeholder identification process. These needs were then prioritized within each user group.

The following needs were identified and are presented in prioritized order by prioritized user group. Needs statements with nonnumerical bullets were not prioritized but are significantly less important than the numbered needs statements.

3.6.1 Site-Specific Information Users

1. Identification and location of sites
2. Usability of site and restrictions on use, how long restricted
3. Extent and nature of residual contamination

4. Risk associated with each site
5. Restrictions on disposal of material
6. Summary and status information (about site)
7. Point of contact for sites
8. Current and future remedial actions for site (if any) and schedule
9. Historical information/photos (before and after)
10. Regulatory requirements for property transfer
 - Chronological history
 - Monitoring data and activities
 - Documentation and Administrative Record

3.6.2 IEPA

1. Identification and location of sites
2. Current status – problems and performance (in place of Quarterly Status Report)
3. Monitoring data
4. Comparison of results with standards
5. Historical data and trends
6. Inspection reports
7. Access to Administrative Record for a given site
 - Schedule of site activities
 - Performance requirements
 - Historical information (detailed) chronology
 - Contact Us (e-mail link to ANL-E point of contact)

- LTS Implementation Plan (not site-specific information)

3.6.3 LTS Technical Team

1. Identification and location of sites
2. Monitoring data (input/output)
3. Comparison of results with standards (input/output)
4. Inspection reports (input/output)
5. Historical data and trends
6. Current status – problems and performance (input/output)
7. GIS information (input/output)
8. Performance requirements
9. Access to Administrative Record for a given site
 - Schedule of site activities (detailed)
 - Historical information (detailed) chronology
 - Contact Us (e-mail link to knowledgeable individuals)
 - Budget for technical area
 - LTS Implementation Plan (not site-specific information)

3.6.4 LTS Program Manager

1. Monitoring data
2. Comparison of results with standards
3. Historical data and trends
4. Inspection reports
5. Identification and location of sites

6. Web site maintenance tools
7. Requirements and procedures to meet needs in general for the LTS Program, and site-specific monitoring, inspection, etc. (input/output)
8. Program Management Plan
9. Access to Administrative Record for a given site
10. Searchable library of project documents (input/output)
11. Budget, schedule, and scope (input/output)
12. Actual schedule
13. Monitoring of field (and other) activities
14. GIS (input/output)
15. Current status (input/output)
16. Contact Us (recipient)
17. Web site usage statistics

3.6.5 ANL-E/UC and DOE Management

1. Status summary
2. Identification and location of sites
3. Site-specific information – historical information and trends, cleanup standards for this site
4. Baseline information – budget, schedule, and scope
5. Actual schedule
6. Quarterly progress reports (or equivalent)
7. Program summary, including activities
8. Regulatory requirements

3.6.6 Public Interest Groups

1. Descriptive summary of problem
 - ANL-E history and activity history
 - Description of problem types
 - Description of program
2. Summary status
3. Summary of sites
 - Maps
 - Site history
 - Nature and extent of contamination
 - Description of remedial actions
4. Risk – health, environmental risk, nature, extent, and location
5. Future
 - a. Future remedial activities
 - b. Schedule
 - c. Description of endpoint
 - d. Budget
6. Contact information
7. Detailed technical information

3.6.7 Local Public

1. Risk – health, environmental risk, nature, extent, and location
2. Future
 - Future remedial activities

- Schedule
 - Description of endpoint
 - Budget
3. Summary of sites
 - Maps
 - Site history
 - Nature and extent of contamination
 - Description of remedial actions
 4. Summary status
 5. Summary of problem
 - ANL-E history and activity history
 - Description of problem types
 - Description of program
 6. Contact information
 7. Detailed technical information

3.7 NEEDS ASSESSMENT RESULTS

The needs assessment identified seven user groups that could loosely be divided into three types:

- *Scientists and Technicians* (Groups 1, 2, and 3 in the Stakeholder Identification List). These users have a strong need for detailed scientific information in a variety of technical areas for individual sites. A small subset of this group needs to input data into the LTSMS.
- *Managers and Overseers* (Groups 4 and 5 in the Stakeholder Identification List). These users need information about the LTS Program and individual sites, but site information needs are less technical, tending more toward summary and status information.

- *Citizens and Interest Groups* (Groups 6 and 7 in the Stakeholder Identification List). These users have little interest in detailed information about individual sites or the LTS Program, but have strong needs for summary and status information about the LTS Program and the sites as a group, especially with respect to health and environmental risks.

The needs assessment also revealed four major requirements for content and services:

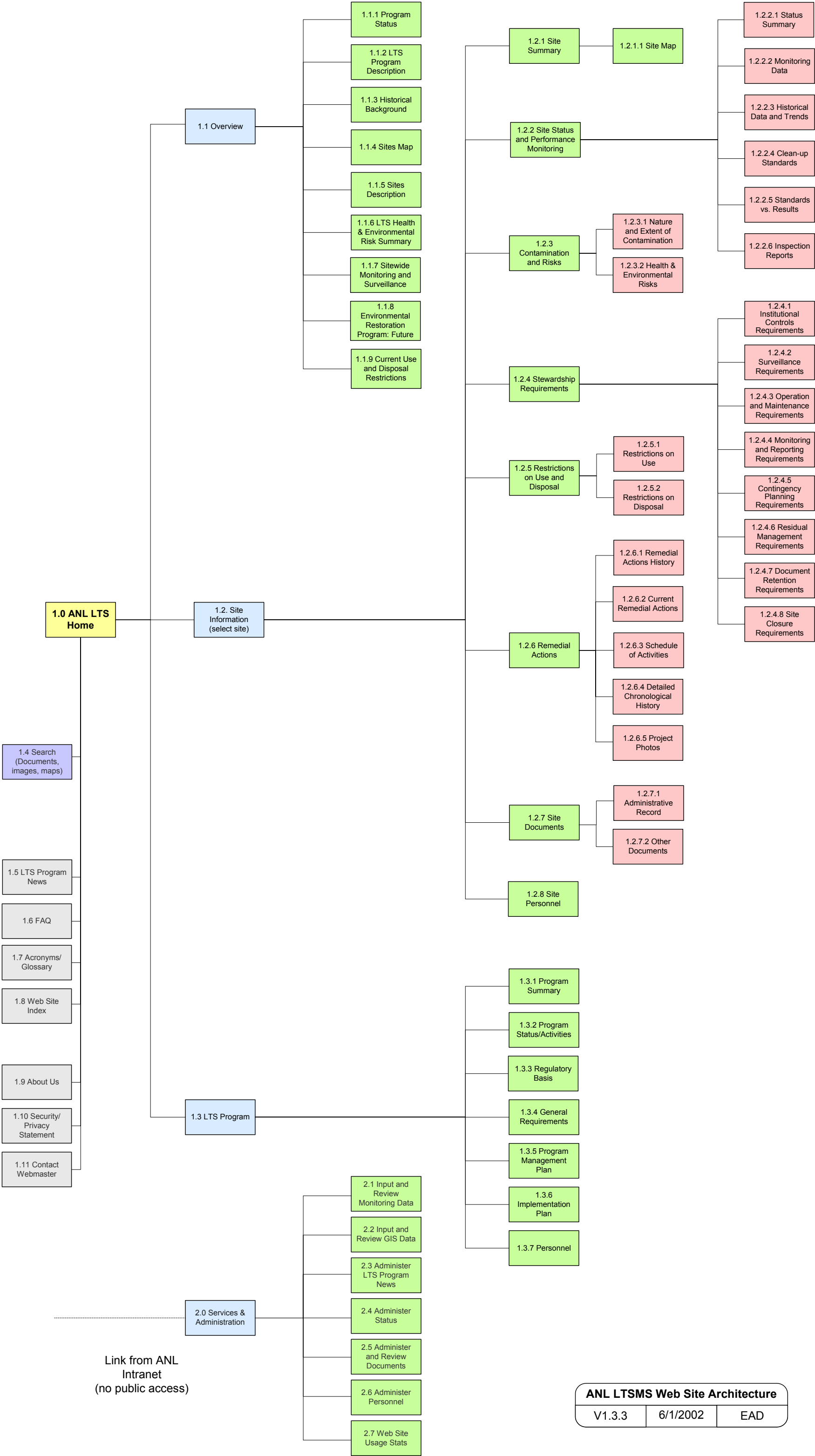
1. Most of the major user groups were highly interested in information about specific ANL-E LTS sites. Providing content organized around the concept of a specific LTS site would be crucial for these users.
2. Several user groups needed access to summary and status information about the LTS Program, individual sites, remedial activities, etc., but did not have a strong need for detailed information about these topics.
3. Some users needed detailed information about the LTS Program itself, outside of the context of a specific LTS site.
4. A small, but important, group of users had distinct needs for data input and administrative services that could not be made available to the public and would require features and user interfaces dissimilar to the rest of the Web site.

These major requirements and the needs of the major user groups largely dictated the design approach for the ANL-E LTSMS.

4 ANL-E LTSMS CONCEPTUAL SITE ARCHITECTURE AND SYSTEM DESCRIPTION

Primarily on the basis of the prioritized needs list, a site architecture diagram was developed for the ANL-E LTSMS Web site (Figure 1). The diagram is conceptual in nature and indicates topical organization of information, although many of the boxes in the diagram correspond to single or, in some cases, multiple Web pages. The boxes are numbered and annotated by number in Appendix A. The annotations provide brief explanations of the contents of each box in the site architecture diagram.

The LTSMS is a database-driven Web site that displays both static and dynamically generated text, graphics, and quantitative data. The system has two major components: the



display interface, or the LTSMS Web site visible to the users, and multiple underlying databases and software systems that drive the display interface and dynamically generate much of the content displayed on the site.

The display interface (the “visible” LTSMS Web site) is divided into two major components: a publicly available subsite for what is essentially read-only access to LTS-related information, and a secure subsite that is used for Web-based administration of the LTSMS and for input for documents, maps, and quantitative data.

For this conceptual design, it was assumed (based on input from the LTS Pilot Project Lead) that full public access to all data and documents (except draft or other unreleased materials) would be given, and the LTSMS Web site design reflects that assumption. At the detailed design stage, a decision would need to be made about the desirability of allowing public access to the detailed site data and documents, and other technical information. The public might find such detailed technical information confusing and a hindrance to site usability, and they might be better served by a separate public site that contains only what is included in the Overview component of the proposed LTSMS Web site. This choice needs to balance the public’s right to know and the desire for openness with good design practice, which calls for providing information and services appropriate to the needs and capabilities of the target audience. An additional factor is the cyber security requirements in effect when the site is built. It is possible that detailed site information, including site maps and photos, would be restricted from public access. Security concerns could change the structure of the site significantly. If such restrictions were in place, much of the site information may need to remain behind the ANL-E “firewall” accessible only through the Intranet. A separate public site would then contain only general descriptive information.

4.1 PUBLIC SUBSITE

The publicly available portion of the LTSMS Web site is divided into three main topics:

1. *Overview.* This topical area contains summary and status information about the LTS Program, including historical background information; a general map showing LTS sites at ANL-E; brief descriptions of the LTS sites; a summary of health and environmental risks; a summary of the sitewide monitoring and surveillance program; a summary of planned restoration activities at LTS sites, and information about current use and disposal restrictions for ANL-E sites, accessed via an interactive map or a sites list. The bulk of the information in this area is essentially static; however, the LTS Program Status and the Current Use and Disposal Restrictions pages would be updated as needed.
2. *Site Information.* This topical area provides summary, status, and detailed information about each of the LTS sites at ANL-E. The user first identifies the site of interest by means of an interactive site-selection tool and then is presented with all of the information relevant to that particular site. Site

information includes site summary; site status and performance monitoring; detailed site maps; nature and extent of contamination, with associated health and environmental risks; stewardship requirements for the site; restrictions on use and disposal; current and future remedial actions; and site documentation, including the Administrative Record. Virtually all of the information in this section would be dynamically generated “on the fly” from a Web-enabled database, and much of the content, for example, monitoring data, would be updated frequently.

3. *LTS Program.* This topical area provides summary, status, and detailed information about the LTS Program as a whole, including a program summary, status, and current activities; description of the regulatory basis for the LTS Program; general requirements for the program; the Program Management and Implementation Plans; and a list of LTS Program personnel. Aside from the program status and current activities information, much of the information in this section is static and would require infrequent updating.

The Home Page for the LTSMS site would include a direct link to the Current Use and Disposal Restrictions page (in the Overview), so that users can quickly assess use and disposal restrictions for any site where activities are planned.

4.2 SERVICES AND ADMINISTRATION SUBSITE

A secure, nonpublic section of the ANL-E LTSMS Web site is devoted to Web-based administration of the site itself (and related services), along with data input capabilities for documents; maps and related spatial data; personnel information; and news, calendar, and site and program status information. Users of this section of the Web site would also have access to data and documents that are in the draft stage, or not yet released for public access. Web access to the subsite would likely be provided through the ANL-E Intranet and would require user name, password, and perhaps other security-related procedures. Limited access to this portion of the site is required for quality assurance/quality control reasons and to prevent “hacking” and other inappropriate use of the site or related hardware and software. The lack of detail in this section of the architecture is deliberate, because detailed decisions about the approach to this section highly depend on site- and resource-specific technological considerations, which are beyond the scope of this effort.

4.3 UNDERLYING DATABASES AND SOFTWARE SYSTEMS

“Behind” the LTSMS Web site are databases that provide much of the text and other information displayed on the site, and software that drives the display of content on the Web site. A variety of databases at different locations would be connected to the LTSMS to provide access to documents, maps, photos, and quantitative data; GISs would provide dynamic mapping and spatial analysis capabilities. The exact extent and nature of the integration of disparate databases and other software systems would be determined at a later stage in the design process, as it

would require detailed technical knowledge of the systems and detailed information about human and financial resources.

5 SYSTEM DEVELOPMENT APPROACH AND TECHNICAL CONSIDERATIONS

A system such as the LTSMS is intended to have an extremely long life — far beyond the normal lifespan of most information systems. It is almost certain that the technology underlying the LTSMS will undergo substantial alteration over time; in essence, the technology will have to be revamped continually. Ten years from now, Web sites will certainly look and behave differently than they do today, and there is a strong possibility they may not exist at all as we know them today. The software applications that drive the display of database data will undergo radical transformations; GIS software will undergo major improvements; and database capabilities may expand enormously. This presents unique challenges to system designers and will necessitate an unusual degree of careful planning at the detailed design stage.

At the development stage, some general approaches might help reduce technology-related problems throughout the lifetime of the project. It is very likely that display interface technologies (Web sites and related software) will change at a very different pace than database technology. Therefore, it may be advisable to design a system that separates display functions as much as possible from the underlying database technologies so that changes in display technology do not affect the database technology as much as they would if the two technologies were tightly integrated.

Another general approach that might reduce long-term problems is to minimize the complexity of the system as much as possible. In general, simpler systems are easier to adapt to changing technologies than complex ones; this concept is especially important for resource-constrained systems (as the LTSMS is likely to be).

The long-term resource constraints likely to affect the LTSMS must be considered in every stage of system design. The burden of maintaining the system must be considered carefully, as ultimately the maintenance costs will dwarf the development costs. Use of dynamically generated content (from databases) can greatly reduce maintenance costs by allowing multiple instances of content to be altered in one location (the database) rather than changing each instance of the content if it appears on multiple pages on the Web site. By separating content from the display interface, changes in display technology can be made without laborious alteration of content on numerous Web pages. Fortunately, much of the information on the LTSMS Web site relating to individual sites is very similar (i.e., the system displays the same type of information for every site); thus, the same display interface can be used for every site, and the site-specific content can be dynamically generated from the database every time the page is requested. Essentially, one set of pages displays the content for any number of sites. Changes to the page layout can be made in one place and will affect the display for all of the sites. This database-driven approach allows significant savings in maintenance costs.

Another important development consideration for reducing implementation costs is to utilize existing data, documents, and other resources as much as possible. Much (perhaps most) of the content for the LTSMS Web site (particularly documents) currently exists at other locations at ANL-E (and possibly elsewhere), and therefore should not need to be created for the LTSMS; part of the design process should be a careful examination of these resources and development of a strategy for inclusion of existing data and documents in the LTSMS.

6 PHASED DEVELOPMENT AND IMPLEMENTATION APPROACH

If implemented, the LTSMS conceptual design would result in a Web site with hundreds of individual Web pages, hundreds or thousands of supporting documents, and several complex services by which data were displayed, input, and otherwise manipulated, which involve linkages to other software or databases at ANL-E. Detailed design and implementation of all of the features and services presented here would involve a complex multiyear design and development effort, requiring a minimum of several hundred thousand dollars. Given current resource constraints at ANL-E, it would probably not be possible to build the entire site at once and would be inadvisable anyway. A phased development and implementation approach is likely to be necessary, one that would build functional components of the Web site in steps, with additional functionality to be added after initial launch as funding and other constraints permit.

A detailed phased development and implementation plan can only be developed after a more detailed basic design process, but some general guidelines or approaches can be generated at the conceptual design stage. Typically, the approach is dictated by a particular strategy, such as building the least complicated system components first, tackling the largest portions immediately, building the components that will satisfy the broadest sets of needs for the largest number of users, etc. Some alternatives for the ANL-E LTSMS include:

- *Strategy 1.* Build the smaller, easier components first and try to optimize needs satisfaction for the broadest groups of users.
- *Strategy 2.* Build the components in order of their usefulness to the major user groups.
- *Strategy 3.* Build portions of some or all components at each stage of development.

Strategy 1 calls for dividing the site into four major development components that mirror the site architecture: Overview, Site Information, LTS Program, and Services and Administration. In order of increasing development complexity and cost, the likely order is Overview (easiest and least expensive), LTS Program, Site Information, Services and Administration (most complex and expensive); thus, this strategy calls for building the site in that order. An advantage of this approach is that early completion of the Overview and LTS Program components satisfies at least some needs of many user groups and would result in a functional Web site as quickly as possible and at the lowest cost. This strategy presents the

opportunity to “build on success”; however, if no further development takes place after one or both of these components, a broadly usable, functioning site is still available. The site would meet most of the needs of the Managers and Overseers user groups (Groups 4 and 5 in the Stakeholder Identification List) and the Citizens and Interest Groups user groups (Groups 6 and 7 in the Stakeholder Identification List).

The primary disadvantage of the Strategy 1 phased development and implementation approach is that it leaves many needs of the Scientist and Technicians user groups (Groups 1, 2, and 3 in the Stakeholder Identification List) unmet, unless and until the later stages of site development are reached. These user groups are interested primarily in detailed site information, and in some cases data input and review. If the resources available to the LTSMS development project are limited, these stages might not be reached for many years, if ever. The perceived failure of the LTSMS Web site to meet the needs of important user groups early on may result in its being regarded as a failure in general, which could jeopardize allocation of resources for further development.

Strategy 2 calls for building the Site Information component first because it is the main need for the primary user groups. The second component would likely be the LTS Program component, followed by the Services and Administration component, and finally the Overview component, as that component would benefit primarily the least important user groups.

The primary advantage of the Strategy 2 phased development and implementation approach is that it addresses the major needs of the most important users at the beginning of the development and implementation process (by providing the Site Information component first), thus getting the most important information and services to the people who need it the most, as soon as possible.

The primary disadvantage of Strategy 2 is that it involves a greater commitment of resources in the early stages of development and will take longer to reach even a basic level of functionality. The Site Information component of the LTSMS Web site is by far the largest in terms of content and is considerably more complicated than either the Overview or the LTS Program component. If required resources are unavailable at the beginning of the development process, only a partial solution could be built, which might not adequately meet the needs of the users. A high initial investment in the LTSMS might make it harder to get the resources to start the project. Because the Site Information component is large and complex, it involves higher risk of a cost overrun early in the development process, which might make it difficult to obtain further required funding to complete system development.

Strategy 3 involves simultaneous development of portions of some or all of the Web site components in a phased approach (e.g., portions of the Site Information component might be developed along with all or part of the Overview component, and limited LTS Program subsections). This approach attempts to satisfy at least some needs of most or all of the various user groups early in the development and implementation process, with gradual completion of the components in the later stages of development. If sufficient resources are available for the initial development effort to complete substantial portions of some or all of the components, this might be a good approach because most users would get some benefit from it and are likely to

support further development. If sufficient resources are not available, however, or cost overruns occur in the initial development effort, there is high risk that the site will be so incomplete that it will be of little use to any user groups.

7 SAMPLE WEB PAGES FROM HYPOTHETICAL LTSMS WEB SITE

Figures 2 through 7 (which follow Section 9) illustrate the possible appearance of typical Web pages from a hypothetical LTSMS for ANL-E, using the site architecture shown in Figure 1. These illustrations are intended to provide an idea of the “look and feel” of the LTSMS to a user.

8 MORTGAGE REDUCTION OPPORTUNITIES

Mortgage reduction benefits (reduction in long-term cost of the program) provided by an Internet-based LTS management tool fall into three major areas:

- Direct cost avoidance by reducing communications-related costs for effort and materials, such as copying printed documents, mailing documents, etc.
- Direct cost avoidance by providing centralized information and communications management rather than by developing and maintaining multiple information management systems.
- Indirect cost avoidance by increasing management effectiveness through enhanced communications and data dissemination.

8.1 DIRECT COST AVOIDANCE BY REDUCING COMMUNICATIONS-RELATED COSTS FOR EFFORT AND MATERIALS

Electronic information management offers significant opportunities for reducing the cost of effort and materials used for communication purposes. Besides the obvious savings on paper purchase and handling, the use of e-mail and web-based communication tools reduces the cost of communication activities, because electronic communications can generally be prepared, revised, copied, and distributed faster than paper-based communications. Unit dissemination costs are near zero (i.e., almost no additional cost is associated with disseminating 10,000 documents via the Web vs. 10 documents).

Primarily because the LTS Program involves thousands of documents, maps, and other communications, the potential direct savings on communications-related expense by using the Web-based LTSMS is potentially enormous. For example, if the IEPA agreed to use the proposed LTSMS Web site for monitoring progress, instead of the written Quarterly Progress

Report, more than \$60,000 per year in production costs could be saved for this document alone. The distribution cost savings for the many other documents that would be available via the LTSMS might greatly exceed these savings. Making key documents readily available over the Internet would eliminate many hours of effort per year to locate, copy, and transmit historic records to affected stakeholders.

8.2 DIRECT COST AVOIDANCE BY PROVIDING CENTRALIZED INFORMATION AND COMMUNICATIONS MANAGEMENT

The proposed Web-based LTSMS would provide convenient, centralized access to the vast amounts of information required for a successful LTS Program. That information would likely otherwise be distributed among multiple paper- and computer-based information systems throughout ANL-E, rather than one system. Using one system to manage and disseminate the various types of information provides the opportunity for significant system development and maintenance cost savings. Even greater savings would be realized by eliminating wasted effort for users trying to locate documents and data that would otherwise be scattered throughout multiple information management systems. Finally, the use of one common interface and navigation system for accessing information via the LTSMS would reduce effort required to learn how to navigate and acquire information.

Integrating all information management functions (including the monitoring data), would make review and dissemination of information more efficient. There are a number of similar needs for the same kinds of information related to the former waste sites from the different regulatory agencies and other stakeholders. Having a strong central information management system would allow these various information requests to be met quickly and efficiently without duplicating the information and effort to produce the information.

8.3 INDIRECT COST AVOIDANCE BY INCREASING MANAGEMENT EFFECTIVENESS THROUGH ENHANCED COMMUNICATIONS AND DATA DISSEMINATION

If well-executed, the proposed LTSMS would offer potentially significant indirect cost savings through increased LTS Program management effectiveness. This presupposes that providing convenient, cost-effective access to important information would result in higher-quality management decisions, which would in turn lead to a more cost-effective LTS Program.

The convenient, centralized access to critical data and documents through LTSMS makes it possible to get more information for a given amount of time and effort. This capability would allow LTS managers to incorporate more information into their decision-making process, which should result in higher-quality decisions and more effective LTS program management. Without LTSMS, decision makers might often lack adequate resources or time to gather the full set of information required to make the best decisions.

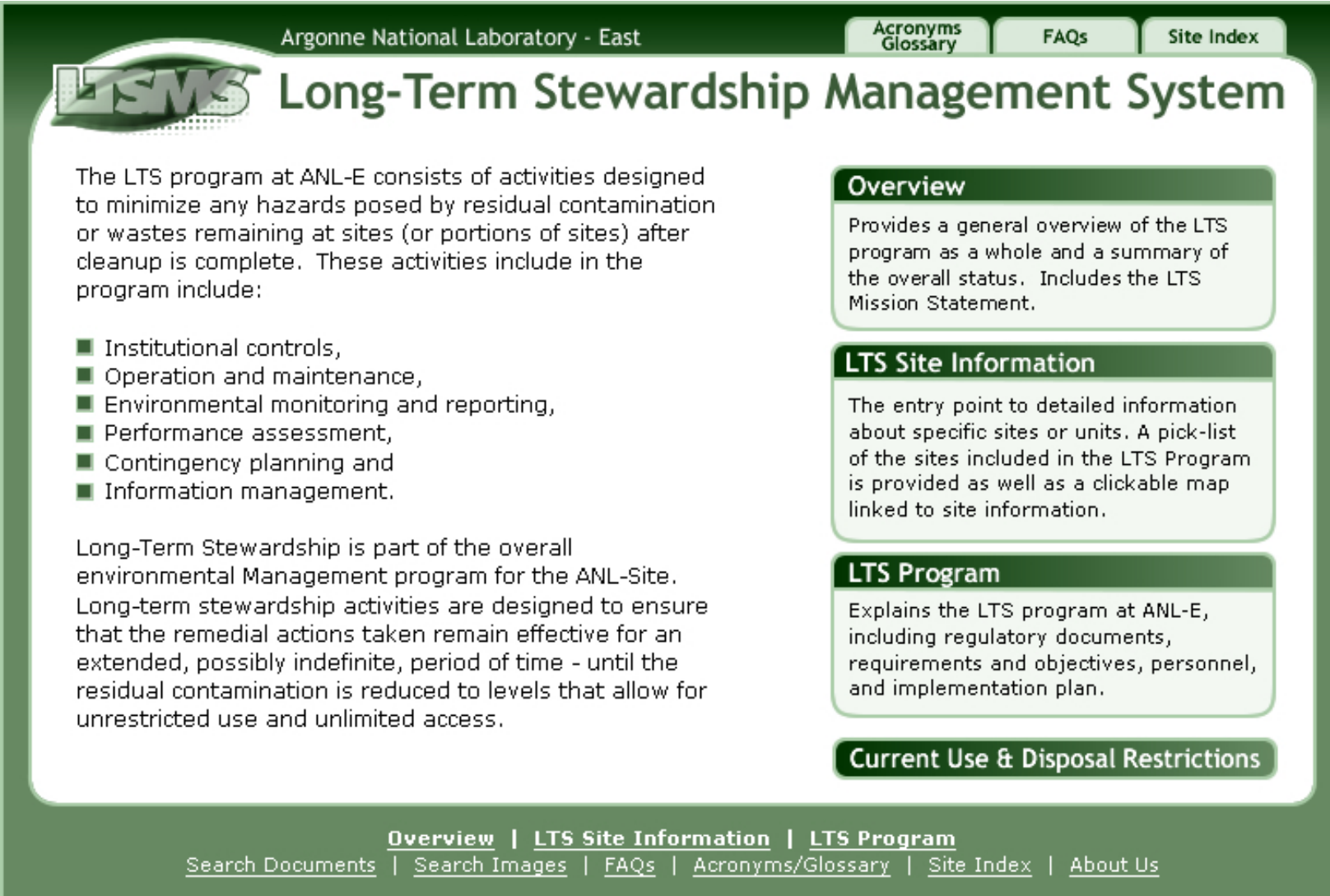
For example, making residual contamination data easily available through LTSMS, particularly data about structures such as former D&D sites, could prevent worker exposure to hazardous materials and prevent potential releases of contaminated material that could be very expensive and difficult to clean up. Having up-to-date information about site-specific cleanup requirements could eliminate unneeded or improperly conducted cleanup activities, as well as help avoid costly delays to the site closure process.

Furthermore, managing information in one centralized system would help ensure that program managers, regulators, and stakeholders are using the same data sets for making and interpreting decisions. Whenever multiple information management systems exist, there is the potential to maintain the same data, or interrelated data, in multiple locations. This can give rise to storage and maintenance of duplicative and conflicting data sets. Ultimately, maintaining a single system should translate into enhanced program management, higher-quality decisions, increased efficiencies, and better communications.

9 CONCLUSIONS

The design brief and other information in this document present a conceptual design approach for development of the ANL-E LTSMS. While needs, requirements, and constraints specific to ANL-E ultimately determined the nature of the design solution, it is likely that many of those needs, users, requirements, and constraints are common to sites across the DOE complex; thus, the information should be useful to other LTS personnel considering development of similar systems. Because the design process was systematic and documented, LTS personnel from other DOE sites can easily compare their unique needs and requirements to those presented here and adjust their design approaches accordingly. Finally, the conceptual nature of the design presented here precluded detailed technical specifications that might not be appropriate for other sites' unique situations and focused on general principles of organization of information and user-centric design practices that should be useful in any similar design effort.

Although development and maintenance of a comprehensive information management system require a financial investment, such a system should translate into potentially significant cost savings, or mortgage reductions. Although not quantified in this document, direct cost savings associated with the ANL-E LTSMS should be greater than the dollars invested in developing and maintaining the system. In addition, indirect cost savings realized through enhanced communications and data dissemination are likely to be significant, particularly over the projected lifespan of the LTS Program.



Argonne National Laboratory - East

LTSMS Long-Term Stewardship Management System

The LTS program at ANL-E consists of activities designed to minimize any hazards posed by residual contamination or wastes remaining at sites (or portions of sites) after cleanup is complete. These activities include in the program include:

- Institutional controls,
- Operation and maintenance,
- Environmental monitoring and reporting,
- Performance assessment,
- Contingency planning and
- Information management.

Long-Term Stewardship is part of the overall environmental Management program for the ANL-Site. Long-term stewardship activities are designed to ensure that the remedial actions taken remain effective for an extended, possibly indefinite, period of time - until the residual contamination is reduced to levels that allow for unrestricted use and unlimited access.

Overview
Provides a general overview of the LTS program as a whole and a summary of the overall status. Includes the LTS Mission Statement.

LTS Site Information
The entry point to detailed information about specific sites or units. A pick-list of the sites included in the LTS Program is provided as well as a clickable map linked to site information.

LTS Program
Explains the LTS program at ANL-E, including regulatory documents, requirements and objectives, personnel, and implementation plan.

Current Use & Disposal Restrictions

[Overview](#) | [LTS Site Information](#) | [LTS Program](#)
[Search Documents](#) | [Search Images](#) | [FAQs](#) | [Acronyms/Glossary](#) | [Site Index](#) | [About Us](#)

FIGURE 2 Example of ANL-E LTSMS Web Site Home Page

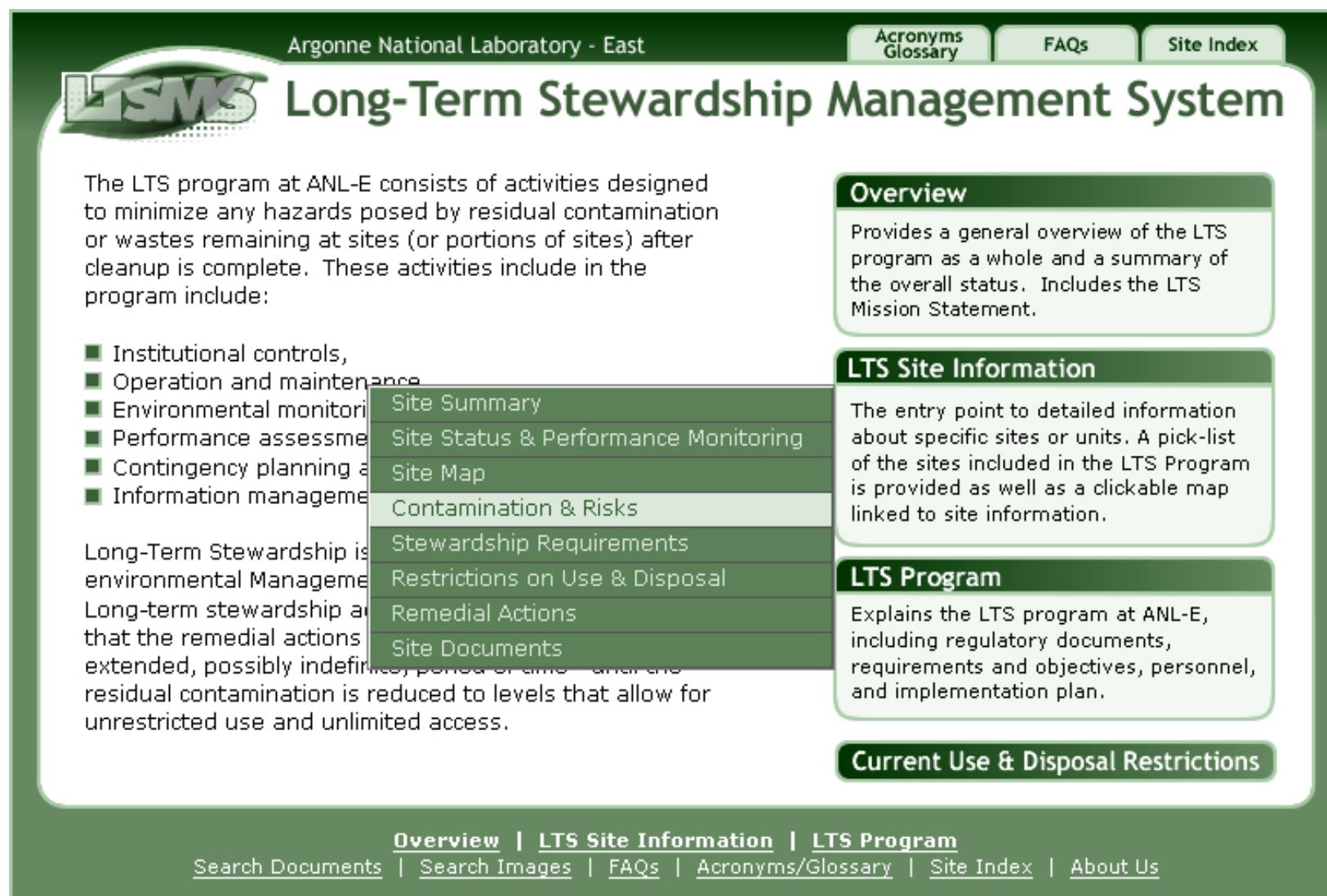


FIGURE 3 Example of ANL-E LTSMS Home Page with Rollover Menu

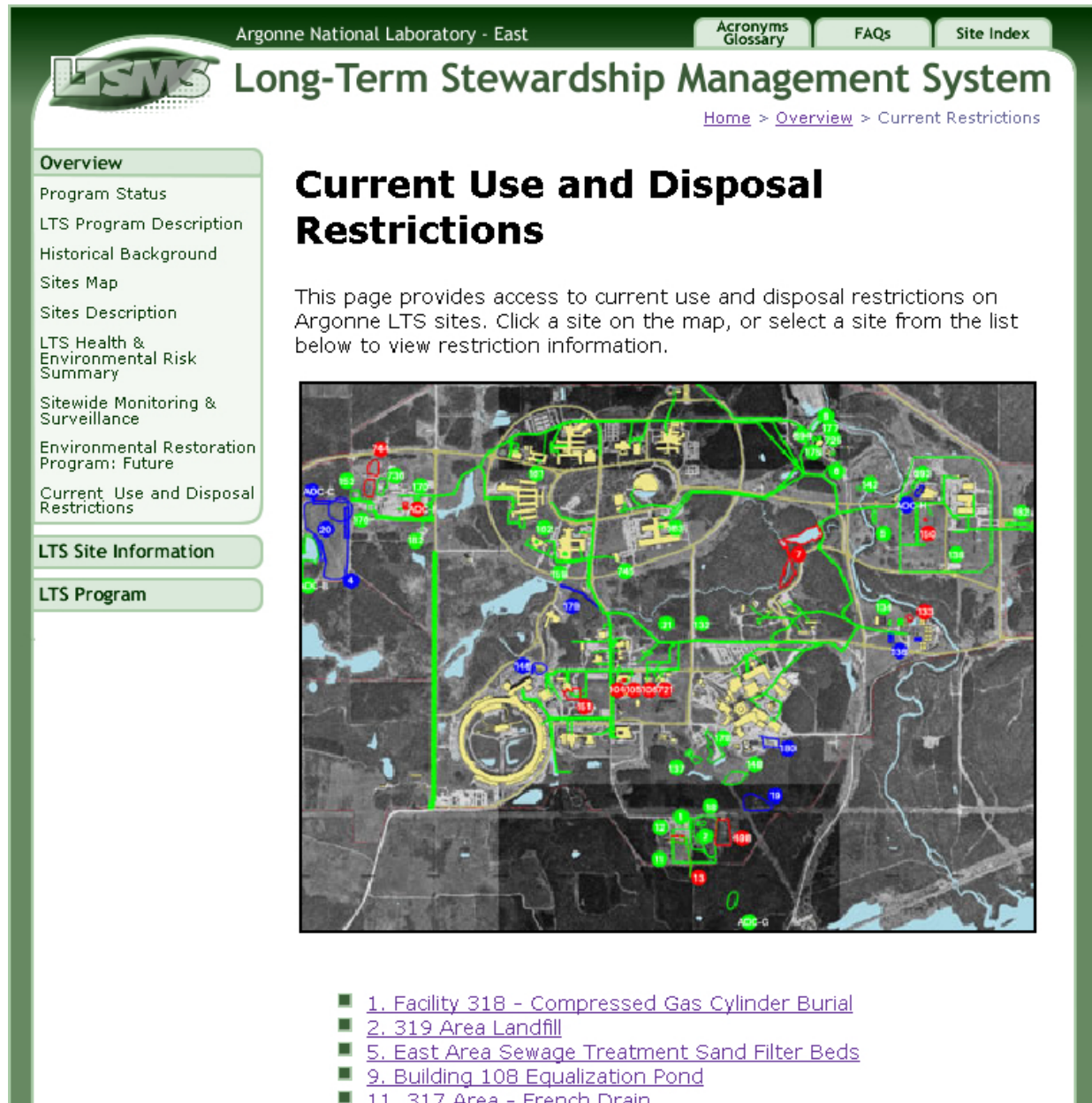


FIGURE 4 Example of ANL-E LTSMS Current Use and Disposal Restrictions Page

Argonne National Laboratory - East

Acronyms
Glossary
FAQs
Site Index



Long-Term Stewardship Management System

[Home](#) > LTS Site Information

Overview
LTS Site Information
Site Summary
Site Status & Performance Monitoring
Contamination & Risks
Stewardship Requirements
Restrictions on Use and Disposal
Remedial Actions
Site Documents
LTS Program

LTS Site Information

317 French Drain

The 317 French drain is located in the north-central part of the 317 Area, immediately north of the north row of waste storage vaults. It consisted of an buried trench filled with gravel. Liquid chemical waste was poured into the trench where it soaked into the ground. The area contains numerous volatile organic chemical to a depth of 30 feet. Contaminated groundwater is also present. The waste was not radioactive, however some tritium is present due to releases from the vaults or past surface storage of radioactive materials.



View of French Drain area with phytoremediation trees planted over it. View is from the top of the 319 Landfill looking directly west. Structures to the right (from the nearest to the farthest units) are the Deep Vault, former Map Tube Facility and the North Vault.

Use the menu on the left to get more information about this site.

Overview | LTS Site Information | LTS Program

[Search Documents](#) | [Search Images](#) | [FAQs](#) | [Acronyms/Glossary](#) | [Site Index](#) | [About Us](#)


FIGURE 5 Example of ANL-E LTSMS Web Site Main Topic Page (LTS Site Information)

Argonne National Laboratory - East

Acronyms
Glossary

FAQs

Site Index

 **Long-Term Stewardship Management System**

[Home](#) > [LTS Site Information](#) > [Site Summary](#)

Overview

LTS Site Information

LTS Program

Site Summary

Site Status & Performance Monitoring

Contamination & Risks

Stewardship Requirements

Restrictions on Use and Disposal

Remedial Actions

Site Documents

317 French Drain

Site Map

Site Summary

Unit 11

Size:
300 ft east to west by 150 ft north to south

Contaminants:
Many different volatile organic compounds (VOC) and tritium. Principle contaminants are chloroform, carbon tetrachloride, tetrachloroethene, trichloroethene, and 1,1,1 trichloroethane.

Actions Taken/Status:
Extensive characterization and remediation efforts have been undertaken in this area. In the late 1980s a footing drain around the waste storage vaults was cut and plugged to prevent the discharge of contaminated groundwater. In 1997 Thirteen groundwater extraction wells were installed at the ANL-E fence line to capture groundwater migrating off of the ANL-E site. Following the discovery of the three contaminated off-site groundwater seeps, a monitoring program for these seeps was initiated. No other remedial actions have been required at this point. In 1997 the southern part of the East Vaults Footing Drain (legs 5 and 6) was sealed by injecting grout into the pipe and the porous backfill surrounding the pipe. The northern part of the system, from the North Vault to the lift station, remains in operation. In 1998 about one third of the area was treated by deep soil mixing with metallic iron addition. Significant contamination remains, particularly north of the North Vault and the former Map Tube facility. In 1999 a phytoremediation plantation was installed in the 317 French Drain, and a second plantation was installed downgradient of the French drain and downgradient of the 319 Landfill. Currently about 270 willow trees are growing in the French Drain area and about 500 trees downgradient of this area.

Schedule:
All planned remedial actions for this area have been installed and are in operation. Operation of these systems will continue for many years.

Contact:
Larry Moos
lmoos@anl.gov
(630) 252-3455
<http://www.erp.anl.gov/members/moos>

Overview | LTS Site Information | LTS Program

[Search Documents](#) | [Search Images](#) | [FAQs](#) | [Acronyms/Glossary](#) | [Site Index](#) | [About Us](#)

FIGURE 6 Example of ANL-E LTSMS Web Site Secondary Topic Page (Site Summary)

APPENDIX A:
**DESCRIPTION OF LONG-TERM STEWARDSHIP
MANAGEMENT SYSTEM WEB SITE ELEMENTS**

TABLE A.1 Description of Long-Term Stewardship Management Systema Web Site Elements

No.	Element Title	Description
1	ANL-E LTS Home	Entry point into Web site that is accessible both on- and off-site; index to all subordinate elements.
1.1	Overview	Index page that provides a general overview of LTS program as a whole and summary of overall status, including the LTS Mission Statement.
1.1.1	Program Status	Brief, high-level statement on the status of the management of residual risk and contaminated media.
1.1.2	LTS Program Description	Description of why an LTS Program is needed, what the program is at ANL-E, and how it is managed.
1.1.3	Historic Background	Description of past activities that created contaminated areas, measures taken to remove or contain contamination, and active remedies that are in place. This will be a high-level summary discussion (details are in the site-specific elements).
1.1.4	Sites Map	Interactive GIS-based map of the ANL-E site showing the location of remediation sites, with user-configurable display features to help identify different types of sites and site-specific information linked to map features.
1.1.5	Sites Description	Types of sites in the program and more detailed information referenced in the site-specific elements.
1.1.6	LTS Health and Environmental Risk Summary	High-level summary of contaminants present at the site and the degree of risk posed by those contaminants.
1.1.7	Sitewide Monitoring and Surveillance	Introduction of this program as an element of the overall stewardship program; links to the EQO Web site for this program.
1.1.8	Environmental Restoration Program: Future	Types of environmental restoration activities that will be required in the future, including continuing O&M, demolition of D&D facilities and future D&D of operating units.
1.1.9	Current Use and Disposal Restrictions	Summary of types of land use restrictions required at specific sites and the types of controls over disposal of soil or building materials that would be needed in the future. Provides a quick link to sites where such restrictions exist.
1.2	Site Information	Entry point for detailed information about specific sites or units. A pick-list of the sites included in the LTS Program will be provided as well as a clickable map linked to site information.
1.2.1	Site Summary	A brief (one- or two-page) summary of the history, nature of contaminants, and current conditions of each site.

TABLE A.1 (Cont.)

No.	Element Title	Description
1.2.1.1	Site Map	Detailed map(s) of each site or unit showing physical properties of the unit, contaminated areas, and other information.
1.2.2	Site Status and Performance Monitoring	Index page to a set of pages that provide critical information related to the current site status, performance of remedial systems, results of monitoring activities, contaminant levels compared with cleanup standards and other unit-specific information.
1.2.2.1	Status Summary	Brief summary of current overall status of each unit and related issues.
1.2.2.2	Monitoring Data	Access point into monitoring data management system, possibly with links to monitoring data Web site, written reports, or other sources.
1.2.2.3	Historic Data and Trends	Monitoring data presented in long-term trend plots that illustrate the effectiveness of a remedial action or other information.
1.2.2.4	Cleanup Standards	Table showing cleanup standards applicable to the given site.
1.2.2.5	Standards versus Results	Comparison of historic or recent contaminant levels with cleanup standards.
1.2.2.6	Inspection Reports	Historic inspection reports (800 Area, 319 Area, and East-Northeast landfills) that are retained and made available for review.
1.2.3	Contamination and Risks	Entry point for detailed information on the nature of risk associated with each site or unit.
1.2.3.1	Nature and Extent of Contamination	Summary of the types of contaminants present and representative concentrations (final sampling results for closed sites); links to the most recent monitoring results for active sites.
1.2.3.2	Health and Environmental Risks	Potential consequences of residual contamination, including a Site Conceptual Exposure Model and quantitative risk characterization, where one exists.
1.2.4	Stewardship Requirements	Entry point for detailed information about actions required at each site or unit. Where possible, source documents that describe the requirements will be referenced.
1.2.4.1	Institutional Controls Requirements	Description of controls needed to prevent disturbance of buried waste or residual contamination and contact with contaminated media.
1.2.4.2	Surveillance Requirements	Description of the type and frequency of inspections of sites or units and the purpose for the inspections.

TABLE A.1 (Cont.)

No.	Element Title	Description
1.2.4.3	Operation and Maintenance Requirements	Description, where applicable, of the types of systems or processes that need to be operated and maintained; links to documents describing detailed O&M practices and procedures.
1.2.4.4	Monitoring and Reporting Requirements	Where applicable, the types of samples of environmental media or other measurements that need to be collected, the frequency at which this information is needed, and what types of reports are required; links to documents describing detailed monitoring practices and procedures from this element.
1.2.4.5	Contingency Planning Requirements	Precautions, if any, that are needed to detect and respond to a failure of a remedial system; link to the Contingency Plan.
1.2.4.6	Residual Management Requirements	Description of precautions needed at sites where residual contamination could prevent free release of waste materials or soil.
1.2.4.7	Document Retention Requirements	Document retention requirements stipulated by IEPA and DOE and procedures in place to meet these requirements.
1.2.4.8	Site Closure Requirements	Work needed to document that remediation objectives have been met and to remove operational systems and monitoring equipment; reference to Work Plans, as applicable.
1.2.5	Restrictions on Use and Disposal	Entry point for a summary of future site or facility use restrictions or limitations.
1.2.5.1	Restrictions on Use	Summary of any limits or cautions placed on the future use of a site or unit as a result of buried waste or contaminated media.
1.2.5.2	Restrictions on Disposal	Summary of any precautions needed to ensure that the disposal of soil, demolition debris, or other media is conducted properly.
1.2.6	Remedial Actions	Entry point for a summary of past remedial actions taken and current remedial actions in progress, if any.
1.2.6.1	Remedial Actions History	Brief narrative describing remedial actions completed at each unit, including links or references to Work Plans and reports describing these actions.
1.2.6.2	Current Remedial Actions	Ongoing remedial actions that are in place for a given unit, including links or references to Work Plans and reports describing these actions.
1.2.6.3	Schedule of Activities	Future actions needed at sites with ongoing remedial actions, including periodic performance assessments and final closure.
1.2.6.4	Detailed Chronological History	Summary of the operational history and actions taken at a given site in a simple time-line format.

TABLE A.1 (Cont.)

No.	Element Title	Description
1.2.6.5	Project Photos	Key photographs showing the site before, during, and after remediation.
1.2.7	Site Documents	Entry point for a description of the documents associated with each unit.
1.2.7.1	Administrative Record	Lists of documents included in the Administrative Record for each site or unit, including links to electronic documents. Full reference and location of the documents will be provided in a searchable form.
1.2.7.2	Other Documents	List of and reference to other supporting or related documents pertinent to the site or unit.
1.2.8	Site Personnel	Listing of key personnel with historic knowledge of each unit and the remedial activities performed, as well as a list of current contacts for inquiry into the unit.
1.3	LTS Program	Entry point into information about the LTS Program.
1.3.1	Program Summary	Description of the overall LTS program at ANL-E.
1.3.2	Program Status/Activities	LTS Program status and current activities.
1.3.3	Regulatory Basis	Sources of requirements that the LTS Program is designed to address; links to regulatory documents, such as permits and regulations governing the program.
1.3.4	General Requirements	Other requirements and objectives of the LTS Program based on DOE guidance and other factors.
1.3.5	Program Management Plan	Link to the Program Management Plan for the LTS Program.
1.3.6	Implementation Plan	Link to the LTS Implementation Plan for the LTS Program.
1.3.7	Personnel	Lists of personnel responsible for the program, their area of responsibility, and contact information.
1.4	Search Documents	Searchable database of all documents related to former waste sites entered in the Historic Document Library.
1.5	LTS Program News	Quick summary of current or planned LTS activities and issues of general interest.
1.6	Frequently Asked Questions	List of common questions and answers regarding the LTS Program.
1.7	Acronyms/Glossary	List of acronyms used in this Web site and a glossary defining any uncommon terms used.

TABLE A.1 (Cont.)

No.	Element Title	Description
1.8	Site Index	Index of this Web site, showing site structure and providing links to each element.
1.9	About Us	Discussion of the originator and manager of this Web site.
1.10	Security/Privacy Statement	Language stating DOE security policy, providing assurance that visitor privacy will be respected and no personal data will be collected while visiting this site.
1.11	Contact Webmaster	E-mail link to contact Webmaster for questions, comments, bug reports.
Interactive Web Site Content Management Features		
2	Services and Administration	Entry point for a series of tools used to input data and maintain the LTSMS Web site.
2.1	Input and Review Monitoring Data	Tool to add new monitoring analytical results and other measurements to the database.
2.2	Input and Review GIS Data	Tool to upload updated geospatial information used to display maps of LTS sites with links to supporting information.
2.3	Administer LTS Program News	Tool to update various narrative content of this Web site.
2.4	Administer Status	Tool to update sections describing the status of individual sites or units as needed.
2.5	Administer and Review Documents	Tool to add new electronic documents to document library or to update document database.
2.6	Administer Personnel	Tool to change and update personnel information included in this Web site.
2.7	Web Site Usage Statistics	Summary of Web site usage.

^a ANL-E = Argonne National Laboratory-East; DOE = U.S. Department of Energy; D&D = decontamination and decommissioning; EQO = Environment, Safety and Health/Quality Assurance Oversight; GIS = geographical information system; IEPA = Illinois Environmental Protection Agency; LTS = long-term stewardship; O&M = operations and maintenance.

